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CONTENTS

ORTHODONTICS

Basic Facial Pattern and Its Application in Clinical Orthodontics. I. The Maxillofacial Triangle. Herbert I. Margolis, D.M.D., Boston, Mass. ---- 631

Pros and Cons of the Extraction Procedure in Orthodontics. John Sage, D.M.D., Flushing, N. Y. ---- 642

...iations in Response. K. E. Pringle, L.D.S., R.C.S., Eng., London, England 674

...orial. The Separation of the Journals of Orthodontics and Oral Surgery ---- 691

Orthodontics for All ---- 693

...odontic Abstracts and Reviews ---- 695

...s and Notes ---- 698

...ers of Orthodontic Societies ---- 704

ORAL SURGERY

Periodontal Number—Section 2

The Relation of Experimental Diabetes to Periodontal Disease. Irving Glickman, D.M.D., Boston, Mass. ---- 703

Estrogen Implants in Dogs. Daniel E. Ziskin, D.D.S., Edward V. Zegarelli, M.S., D.D.S., and Charles Slanetz, Ph.D., New York, N. Y. ---- 723

Comparative Histopathologic Changes in Experimental Deficiencies of the Various Vitamin B Components. W. W. Wainwright, D.D.S., M.S., Rochester, N. Y. 740

Effects of Vitamin A Deficiency on the Periodontal Tissues. Paul E. Boyle, D.M.D., Philadelphia, Pa. ---- 744

A Similar Condition to Periodontosis Found in Two Spider Monkeys. Henry M. Goldman, D.M.D., Boston, Mass. ---- 749

Gingival Disease in Postwar Italy (1945). II. Gingivosis in Hospitalized Children in Naples. Isaac Schour, D.D.S., Ph.D., and Maury Massler, D.D.S., M.S., Chicago, Ill. ---- 756

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OCTOBER, 1947

Orthodontics

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VOL. 33 OCTOBER, 1947 No. 10

Original Articles

A BASIC FACIAL PATTERN AND ITS APPLICATION IN CLINICAL ORTHODONTICS

I. THE MAXILLOFACIAL TRIANGLE

HERBERT I. MARGOLIS, D.M.D., BOSTON, MASS.

THE objectives in this study are: to appraise the proportional developmental level of the lower third of the face; to describe a basic pattern in the balanced, well-developed face, and to recognize deviations therefrom; to orient the dentition within the face; and to note growth subsequent to orthodontic treatment.

The composite x-ray photographs[1] (Figs. 1, 2, and 3) are of individuals having excellent occlusion and well-developed faces, though differing greatly in appearance. Have they a measurable basic common denominator from which to measure those differences that concern the orthodontist? The illustrations in Figs. 4, 5, and 6 are those of children with different types of malocclusion. They have neither well-developed nor well-proportioned faces. We can classify their malocclusions; we should like also to classify with accuracy the developmental levels of the bones remote from, but affecting, the positions of the teeth.

Broadbent[2] has developed a roentgenographic technique for cephalometrics from which much valuable information has been obtained by himself[3] and by Brodie,[4] Speidel,[5] Higley,[6] Thompson,[7] Wylie,[8] MacDowell,[9] and other investi-

*Professor of Graduate Orthodontics, Tufts College Dental School.
Presented before the Northeastern Society of Orthodontists, November, 1946; also presented as part of a series of lectures at the Tweed Seminar, Tucson, April, 1947.

Fig. 1.

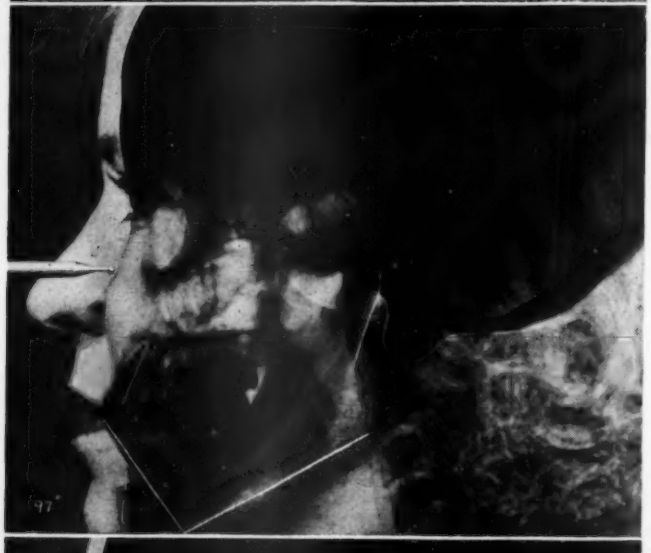


Fig. 2.

Fig. 3.

Fig. 1.—A. W. Composite x-ray photograph of balanced, well-developed, nonprognathous face, normal occlusion.

Fig. 2.—R. B. Composite x-ray photograph of balanced, well-developed face, normal occlusion, slight degree of bimaxillary prognathism.

Fig. 3.—J. A. Composite x-ray photograph of balanced, well-developed face, normal occlusion, severe degree of bimaxillary prognathism.

gators.[10-12] For this paper, tracings were constructed from standardized sagittal cephalic roentgenograms, using my apparatus and technique which have been described in the literature.[13] The observations made from projections on the sagittal plane will therefore demonstrate vertical and anteroposterior dimensions.

Angle[14] admonished the profession to have "fixed in our minds the outline of a perfect face—." Case[15] described the limited area of the face, which in his opinion is the sphere of orthodontic influence. The famous skull, "Old Glory," was credited by Angle with perfect occlusion. It was, however, not the "perfect face" to be used as the objective of orthodontic treatment for white children. Although this skull is normal phylogenetically, the dentition is prognathous compared with that of a modern white.

Fig. 4. Fig. 5. Fig. 6.

Fig. 4.—Child with Class II, Division 1 (Angle) malocclusion and corresponding facial development.

Fig. 5.—R. McT. Child with severe open-bite and imbalance of facial development.

Fig. 6.—D. C. Girl with Class II (Angle) malocclusion and corresponding facial maldevelopment.

Tweed[16, 17] demonstrated to the orthodontic profession that double protrusions have been created much too often and that treatment based solely on tooth relationship has made that deplorable facial end result a rather simple matter with any type of appliance.

The illustration in Fig. 7 is that of a skull of a child with an incipient malocclusion. It is a deformity not confined to the teeth. Todd[18] has emphasized the fact that skulls of dead children are often defective and not the best source of study of normal growth. It is equally true that a great many of our patients have deformities not limited to the dental apparatus. Their skulls, too, particularly the bony parts comprising the lower third of the face, are defective.

In order to appraise proportional deficiencies and abnormalities of growth and to orient the dentition, there must first be established some usable concept of a normal basic facial pattern. The mere suggestion of a basic facial pattern raises objections. Yet there is something common in balanced, well-developed faces, even as there is a common basis of inclined plane relation of the teeth which every orthodontist uses daily as a guide.

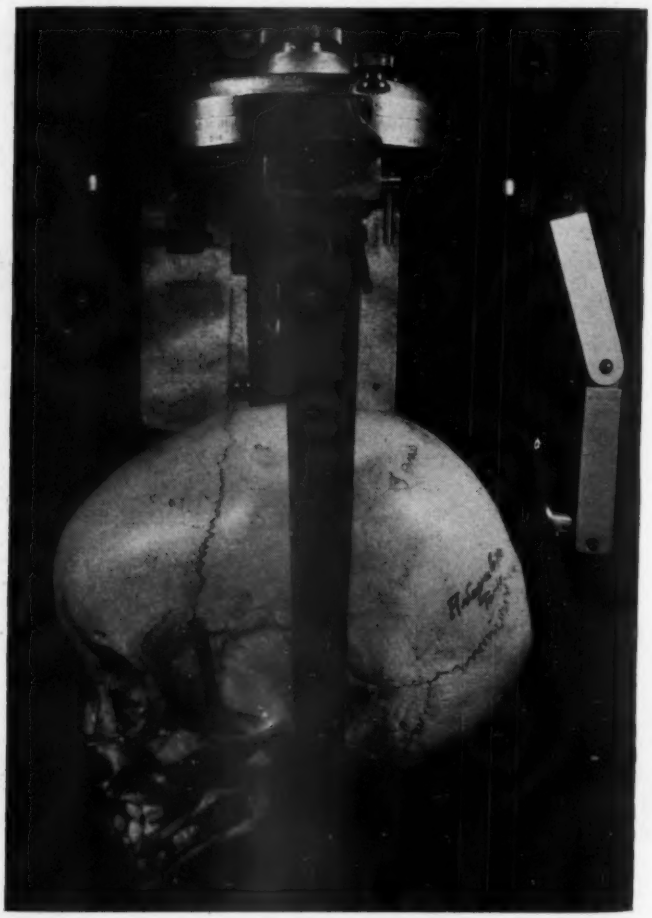


Fig. 7.—Skull of a child showing disproportionate bony development, with incipient malocclusion.

The illustrations in Figs. 8, 9, and 10 show decidedly favorable changes in facial profile after treatment. The illustrations in Figs. 11 and 12 show a facial improvement not as marked as Figs. 8, 9, and 10. The facial change after orthodontic treatment in Fig. 13 shows a very slight improvement. The dental changes in these three groups were equally satisfactory. Cephalometric appraisals, however, in all these cases prior to treatment indicated a fundamental difference in the proportional development of bony structures remote from the teeth. The were quite favorable in Figs. 8, 9, and 10, less so in Figs. 11 and 12, and decidedly unfavorable in Fig. 13.

Broadbent,[19] Brodie,[20] and others have demonstrated that normal growth of the face is an orderly process. There should, then, exist indices or gradi-

A. *B.*

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 8.—P. C. *A*, Before treatment; *B*, after retention, Class II, Division 1 (Angle) malocclusion.

Fig. 9.—M. S. *A*, Before treatment; *B*, after treatment of bimaxillary prognathism.

Fig. 10.—R. S. *A*, Before treatment; *B*, after retention of Class II, Division 1 (Angle) malocclusion.

Figs. 8, 9, and 10 show decided changes in facial profile after orthodontic treatment. The facial patterns were favorable as revealed by cephalic records.

ents of growth. In this study, interest is directed not in the size, but rather in the proportional levels of the growth.

It is time for the orthodontist to refrain from using the term "perfect face," for it has no significance of scientific or clinical value. It cannot be defined, because it does not exist. It means entirely different things to different people. Balance, however, does exist in the well-developed face of man, primitive or modern. Balance is reached in the maldeveloped face just as a

Fig. 11.

A. *B.*

Fig. 12.

A. *B.*

Fig. 11.—S. S. *A*, Before treatment; *B*, after retention (rhinoplasty) Class II, Division 2, subdivision (Angle) malocclusion.

Fig. 12.—E. H. *A*, Before treatment; *B*, after treatment, Class II, Division 1 (Angle) malocclusion.

Figs. 11 and 12 show improvement in facial profile, not as marked as Figs. 8, 9, and 10. The facial patterns of these cases (Figs. 11 and 12) before treatment are not as favorable.

malocclusion will reach a stage of balance. From Angle[21] we have learned how to differentiate precisely malocclusion of the teeth from normal occlusion. We need also criteria to evaluate the balanced, well-developed face and to recognize poorly developed areas within the face which, in turn, affect occlusion. Otherwise, orthodontics will continue along the "by guess and by God" formula and still remain within the field of necromancy.

A. *B.*

Fig. 13.—L. N. *A*, Face before treatment; *B*, face after retention. Class I (Angle) malocclusion. Slight facial changes; occlusion corrected but facial pattern not improved. Cephalic records indicated poor facial pattern.

CONSTRUCTION OF THE MAXILLOFACIAL TRIANGLE

The maxillofacial triangle is constructed on the standardized sagittal cephalic roentgenogram. The three sides are: (1) the cranial base line, *N-X*, (2) the facial line, *N-M*, and (3) the mandibular line, *M-X*. The cranial line is established by the nasion and the top of the occipitosphenoidal suture and is continued posteriorly to meet the mandibular line at *X*. The facial line is established by drawing a line from nasion downward, tangent to the mental eminence at M^1, and continued to meet the forward extension of the mandibular line. The mandibular line is tangent to the inferior border of the mandible, and is continued anteriorly and posteriorly to meet the facial line at *M* and the cranial line at *X*. The three angles formed are the craniofacial angle at *N* (*X-N-M*), the craniomandibular angle at *X* (*N-X-M*), and the faciomandibular angle at *M* (*N-M-X*) (Fig. 14).

My first observations were made on thirty Indian skulls from the Peabody Museum, loaned by Professor Hooton. They were selected on the basis of excellence in occlusion and development of the skull. The results were sufficiently interesting and indicative of a pattern to warrant similar treatment on white American children. One hundred children between the ages of 6 and 19 years were then selected on the same basis. No separations were

made because of national origin, age, or sex. Later, it was observed that separation according to age, sex, or national origin had no effect on the statistical values of the observations.

Observations.—The characteristics of the maxillofacial triangle for the one hundred children fell into a range sufficiently narrow to establish a basic pattern. Table I presents the measurements obtained. This pattern for the nonprognathous, well-developed face exhibited the following criteria:

(1) At *N*, the average of all readings was 72.6° (the range was from 67° to 80°) and 92 per cent of the readings came within 72.6° ± 3.5°.

(2) At *M*, the range was from 62° to 75°, the average was 67.7°, and 85 per cent of the readings came within 67.7° ± 3.5°.

Fig. 14.—N. B. The maxillofacial triangle constructed on a sagittal cephalic x-ray. Face balanced, well-developed and nonprognathous; female, 19 years of age. (See text.)

(3) At *X*, the range was from 30° to 48°, the average was 39.7°, and 81 per cent of the readings came within 39.7° ± 3.5°. (Figs. 15 and 16.)

(4) The mandibular line, when continued posteriorly, touched the occipital bone posterior to foramen magnum or fell below it. (Fig. 14, *N-B*).

(5) The facial line intersected the lingual surface of the crown of the mandibular incisor. (The mandibular incisor may be lingual to the facial line in well-developed faces, when the mental eminence is exaggerated, or when the incisor is inclined lingually.)

(6) The incisor-mandibular angle was 90° ± 3.[22]

Some correlations became apparent. The smaller the angle at *N*, the more receding is the chin. The craniomandibular angle indicates deviations in vertical development of the mandible and corresponds to the Frankfort-mandibular angle of Tweed. A large craniomandibular angle may mean (1) a large gonial angle associated with an open-bite or (2) a short ramus. Anatomic

TABLE I. MEASUREMENTS OF ANGLES OF MAXILLOFACIAL TRIANGLES OF ONE HUNDRED CHILDREN WITH WELL-DEVELOPED, NONPROGNATHOUS FACES*

	N	M	X		N	M	X
S. G.	71.0°	68.0°	43.0°	M. P.	71.0°	68.0°	41.0°
S. W.	73.0°	62.0°	45.0°	R. L.	70.5°	69.0°	40.5°
J. M.	69.0°	68.0°	43.0°	B. G.	72.5°	64.5°	43.0°
S. G.	77.0°	63.0°	40.0°	R. F.	73.0°	68.0°	39.0°
B. I.	73.0°	67.0°	40.0°	P. L.	68.5°	68.5°	43.0°
L. K.	69.0°	66.0°	45.0°	B. M.	74.5°	70.5°	35.0°
M. W.	73.0°	62.0°	45.0°	P. M.	72.5°	69.5°	38.0°
N. B.	74.0°	63.0°	43.0°	N. R.	73.5°	64.5°	42.0°
M. F.	72.0°	70.0°	38.0°	R. S.	72.0°	69.0°	39.0°
E. L.	71.0°	64.5°	44.5°	M. B.	73.0°	70.0°	37.0°
S. B.	72.0°	70.0°	38.0°	E. McS.	72.0°	68.0°	40.0°
P. S.	72.0°	68.0°	40.0°	A. B.	72.0°	69.0°	39.0°
M. W.	75.0°	67.5°	37.5°	V. C.	72.0°	66.0°	42.0°
M. M.	71.5°	62.5°	46.0°	E. G.	75.0°	65.5°	39.5°
B. K.	67.0°	65.0°	48.0°	A. H.	73.0°	69.5°	37.5°
B. S.	72.0°	68.0°	40.0°	P. L.	73.5°	68.5°	38.0°
F. S.	73.0°	68.0°	39.0°	I. S.	69.5°	69.0°	41.5°
M. A.	75.5°	63.0°	41.5°	C. A.	75.0°	65.0°	40.0°
R. G.	72.0°	67.0°	41.0°	S. B.	73.0°	68.5°	38.5°
J. K.	71.5°	65.0°	43.5°	J. B.	69.0°	72.0°	39.0°
D. K.	71.0°	72.0°	37.0°	G. A.	73.0°	68.0°	39.0°
B. K.	76.0°	65.0°	39.0°	E. A.	73.0°	65.0°	42.0°
E. K.	76.0°	64.0°	40.0°	R. C.	74.0°	64.0°	42.0°
M. L.	71.0°	65.0°	44.0°	V. A.	68.5°	71.0°	40.5°
R. L.	72.0°	69.0°	39.0°	T. R.	75.5°	67.0°	37.5°
L. B.	73.0°	69.0°	39.0°	M. S.	72.0°	70.0°	38.0°
H. W.	75.0°	67.5°	37.5°	B. S.	74.0°	64.0°	42.0°
A. T.	75.0°	64.0°	41.0°	G. A.	75.0°	75.0°	30.0°
B. S.	75.0°	68 0°	37.0°	S. F.	72.0°	67.0°	41.0°
P. N.	74.0°	68.0°	38.0°	P. F.	71.5°	69.0°	39.5°
Z. F.	74.5°	69.5°	36 0°	R. K.	70.5°	72.0°	37.5°
A. B.	71.5°	69.5°	39.0°	A. K.	74.0°	72.5°	33.5°
N. E.	77.0°	67.5°	35.5°	R. G.	69.5°	73.5°	37.0°
G. F.	72.5°	66.0°	41.5°	R. H.	74.0°	71.5°	34.5°
H. F.	72.5°	67.0°	40.5°	E. L.	73.5°	72.0°	34.5°
M. G.	71.5°	68.0°	40 5°	R. G.	73.5°	73.5°	33.0°
B. G.	73.0°	68.0°	39.0°	S. L.	75.0°	71.0°	34.0°
N. G.	77.0°	67.0°	36.0°	G. L.	73.5°	71.0°	35.5°
K. G.	73.0°	68.0°	39.0°	H. L.	70.0°	69.0°	41.0°
P. F.	71.0°	67.5°	41.5°	S. L.	70.5°	66.0°	43.5°
J. H.	77.0°	66.0°	37.0°	G. R.	72.0°	70.0°	38.0°
H. G.	70.5°	68.0°	41.5°	J. R.	71.0°	69.0°	40.0°
B. G.	73.0°	65.5°	41.5°	L. R.	71.0°	67.0°	42.0°
M. S.	69.0°	68.0°	43.0°	J. P.	72.0°	68.0°	40.0°
R. K.	73.5°	67.5°	39.0°	P. L.	73.5°	71.0°	35.5°
J. K.	69.0°	67.0°	44.0°	M. M.	75.0°	66.0°	39.0°
M. K.	72.5°	65.0°	42.5°	V. M.	75.0°	64.0°	41.0°
R. K.	74.0°	66.0°	40.0°	R. M.	69.0°	71.0°	40.0°
J. T.	70.5°	65.5°	44.0°	R. P.	80.0°	69.0°	31.0°
C. G.	69.0°	71.0°	40.0°	S. G.	70.0°	67.0°	43.0°

X N M, craniofacial angle.
N M X, faciomandibular angle.
N X M, craniomandibular angle.
See Fig. 14, *N.B.;* also Figs. 15 and 16.

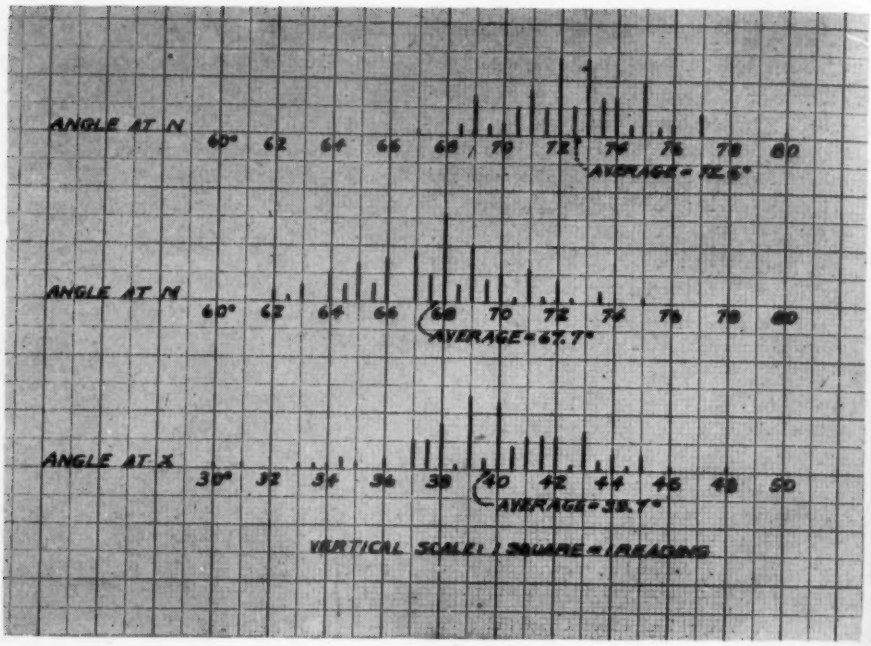


Fig. 15.—Graph made from measurements in Table I. (See text.)

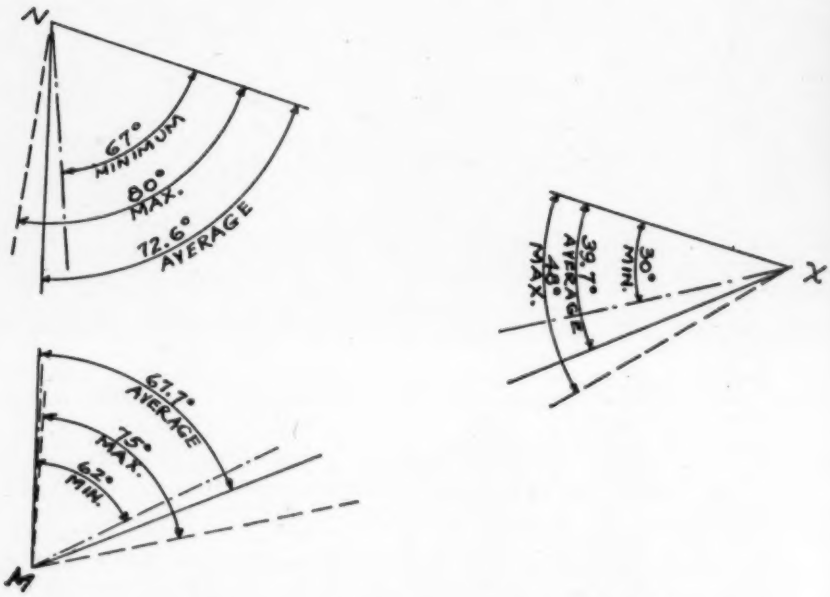


Fig. 16.—Schema of maxillofacial triangle indicating the ranges and averages of the angles. (See Table I and Fig. 15, also text.)

areas within the face are being measured and correlated with the maxillofacial triangle, producing interesting observations which will be reported.

The cranial base line of the maxillofacial triangle may be constructed using landmarks other than the occipitosphenoidal suture. Fig. 17 illustrates this basic triangle using the Bolton plane and sella turcica-nasion plane. Using the Bolton plane as the cranial base, the angle at the nasion was about ten degrees less, and the angle at *X* ten degrees more than the average readings obtained by using the occipitosphenoidal-nasion plane.

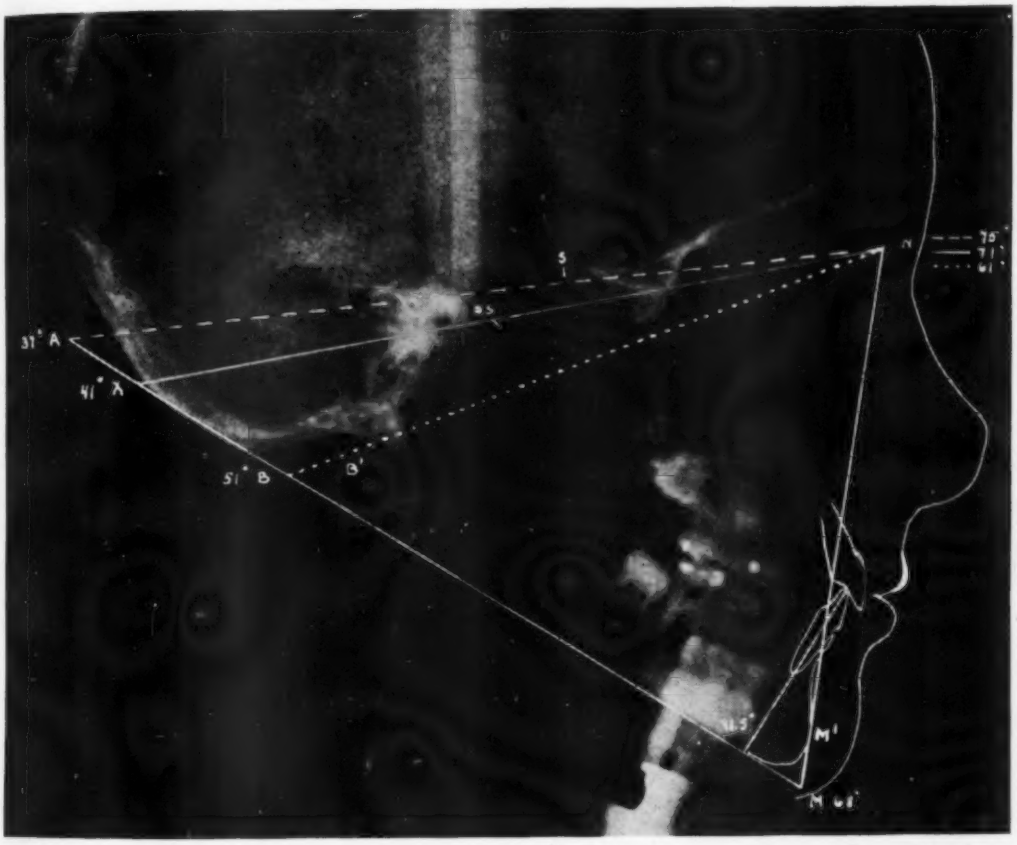


Fig. 17.—Three maxillofacial triangles using different cranial base lines. *N-X* (solid line) is the base used in this study. It passes from nasion through the top of the occipitosphenoidal suture. *N-A* passes from nasion through the center of sella turcica and continues posteriorly. *N-B* is the Bolton plane; all three triangles are constructed on the sagittal cephalic roentgenogram of a girl, aged 13, who has a balanced, well-developed, nonprognathous face. (See text.)

We know precisely where every inclined plane should articulate with its antagonist in normal occlusion in man and in anthropoids. Rarely, if ever, do we find perfection in occlusion. There is a permissible range of variation. Likewise, there exists a pattern in the development of the face. Observations seem to warrant the conclusion that the maxillofacial triangle can serve such a purpose in clinical orthodontics.

(To be continued.)

References.—All references will appear at the end of the series.

THE PROS AND CONS OF THE EXTRACTION PROCEDURE IN ORTHODONTICS

JOHN SAGE, D.M.D.,* FLUSHING, N. Y.

"It is much easier to extract teeth than to determine whether it is absolutely necessary."

Delebarre, 1815.

IN THIS paper an attempt will be made to present:

1. A brief résumé and interpretation of the viewpoint of several prominent orthodontists with regard to the extraction controversy.

2. A rationale of the possible reasons for relapses and generally unsatisfactory results as obtained by certain procedures.

3. A plea for early treatment, to preclude the need for extractions or at least to keep them to a minimum.

4. A modified Mershon lingual to facilitate distal movement of molars.

5. A number of cases typifying the several groups of malocclusions for which reduction of dental units is the procedure of choice; the latter actually becoming the conservative method to be employed, if the results obtained are to be stable and esthetic effects be satisfactory according to present-day standards.

6. A simple procedure for the bodily movement of cuspids and premolars.

To the conservative orthodontist, the procedure involving extraction of various dental units has lacked in appeal as it somehow implied his inability to fully cope with the orthodontic problem. To have to resort to extraction meant to compromise, to give in. However, we have to be realists and face the issues, and not avoid them. Needless to say, Tweed stirred up a hornet's nest. The fact that his results are beautiful cannot be denied, and we would all like to emulate his results, but we are reluctant to accept the "premolar massacre" before we are fully convinced that the procedure will stand the test of time.

Clinical evidence, as presented by non-Tweed men, does not support such a radical change in orthodontic procedure. Brodie[1] states: "It is dangerous for any profession to assume that everything that has been done in the past is wrong and that all its previous findings are fallacious." On the other hand, Salzmann[2] states: "Today there are few men who would insist that extraction has no place in orthodontic practice. The important question is not whether to extract but under what circumstances shall extractions be resorted to as an adjunct to orthodontic mechanotherapy. The rest is dogmatism which can lead but to further confusion."

We have come to realize that the retrogressive evolutionary process that the jaws and teeth are undergoing at present points to a time when the average normal complement of teeth will be greatly reduced. This natural elimination

This thesis was written expressly for the American Board of Orthodontics in fulfillment of partial requirement for certification.

*Chief, Orthodontia Department, Stuyvesant Polyclinic, New York, N. Y.

may be seen in the increase in the number of congenitally missing lower second premolars and also upper laterals. The fact that there is a diminution in the size of the lower jaw as well as the narrowness of the lower third of the face of the Anglo-Saxons is becoming more and more evident.

This discrepancy between the size of the jaws and the amount of tooth material is the problem that Tweed and his followers are attempting to solve by reducing the number of dental units.

J. A. Salzmann[2] states: "When the size of the jaws will not permit the correct positioning of all the teeth at the time of treatment, reduction must be made in the mesio-distal configuration in order to avoid toothiness and incidental relapse."

The extraction controversy is of long standing. Over 150 years ago, Hunter recommended the extraction of the upper first premolars and carrying of the anterior teeth back.

In 1865, Kingsley wrote: "An erroneous teaching has maintained that the full number of teeth must be retained in the mouth, regardless of their organization, the limited capacity of the arch, or the external features. The articulation of masticatory organs is of much more importance than their number, and a limited number of grinding teeth fitting closely in occlusion will be of far greater benefit to the individual than a mouth full of teeth with the articulation disturbed."

George W. Hahn[4] writes: "As there is no known method of developing basal bone, these men felt that, although the integrity of the denture is an ideal to be held, the welfare of the individual patient, both esthetically and functionally, demanded the sacrifice of dental units in the treatment of certain types of malocclusion. It is a form of compromise that must be resorted to only when the most careful analysis of the individual case has been made."

The present-day thinking along this vexing problem has been well expressed by men like Tweed, Hellman, Brodie, Salzmann, and Atkinson. A brief review of their viewpoints should prove enlightening.

Tweed[5] feels that the stimulation of function will not cause new basal bone to grow forward and under protrusive dentures. Most orthodontic patients are not physically normal people. "If they were they would not have malocclusion." He also states that recent scientific findings show that when something is lost in bone growth, it is never regained at a future date. This, he says, results in the discrepancy between tooth pattern and basal bone. He therefore concludes that it is far better to remove dental units to bring about a balance between tooth anatomy and basal bone, thereby getting a nearer approach to the normal, than it is possible if we retain all the dental units and, in doing so, are compelled to displace all the teeth off the dental ridge and into protrusion. He also states that "the philosophy of the full complement of teeth was justified until it was conclusively disproved by recent findings." He believes Brodie is right in indicating that it is impossible to make basal bone grow. He also states: "Many brilliant men have spent a lifetime in orthodontics, butting their heads against the impossible, that has led to so many orthodontic failures and heartaches."

Tweed's contention is that if the teeth in the maxilla and mandible cannot be placed in normal inclined plane relationships without tipping the anterior teeth or pushing the buccal teeth off their bony base, then we had better reduce the number of teeth in each arch and position them over basal bone.

On the basis of his thirty-three years of orthodontic experience and also as a research man, Milo Hellman[6] is not favorably inclined to the Tweed philosophy. He implies that the latter does not have a basis on real fundamental principles. Resorting to compromise actually represents the giving up of accepted and proved principles. He does not consider a case a failure if one lower anterior is crowded out of the arch because, he points out, many museum skulls show normal functional dentitions where a lower anterior is either rotated or crowded out. He feels that extractions of premolars, as a general scheme, would result in crippling the dentition, and obtain esthetic effects at the risk of destroying anatomic integrity and physiologic efficiency. He states that even in "superb dentitions in normal occlusion it will be found that in none of them are the teeth so faultlessly aligned as to be considered orthodontically perfect."

He does not feel that the lower teeth must be placed on top of the ridge. The latter may be of importance to the prosthodontist and of not as much significance to the orthodontist.

He states that the "normal" is not "perfection" and cannot be measured by celestial or divine standards. The "normal" in anatomic and physiologic features need not be 100 per cent perfect to be adequate for the needs of life and health. Moreover, it should be realized that the "normal" in multiple organs cannot be perfect because they are never uniformly identical either in size, position, or function.

He feels that the orthodontist expects too much when he tries to get 100 per cent perfection in "reclaimed or salvaged dentitions, dentitions which started off and grew under abnormal conditions, such as are presented by some of the extreme forms of malocclusion. If so he might be reminded that the machinery he uses in doing it is far too dangerous. The damage he is inflicting, such as irritation of gums, resorption of cementum, dentine, bone, devitalization of teeth, is far too serious." He wishes the orthodontist to "at least learn to ponder on the significance of a comparison between a complete dentition with some crowded incisors or a crippled dentition with the incisors in even alignment."

Failures, he claims, are usually cases that were treated but not corrected. They are due to "incompetence and uncontrollable factors which interfere with the attainment of results."

Unfortunately, Dr. Hellman did not state whether the conventional treatment does or does not result in toothiness; also whether or not he compromises on esthetics for the sake of maintaining a full complement of teeth.

On the other hand, Dr. Tweed did not investigate the stability of cases which were treated by other methods, and, therefore, his conclusions are based on the reports of only a certain percentage of the orthodontists.

Allan G. Brodie[1] writes: Position of lower incisors is "dependent on such factors as ethnic origin and genetic admixtures" and that "to insist that all

lower incisors must stand upright to be considered normal is just as untenable as to insist that all foreheads be high or all noses of the Roman variety."

He advises to disturb lower anteriors as little as possible and, if possible, to tip them lingually. Brodie finds that axial inclination of lower incisors shows a great deal of variability and their mean value cannot be used as a norm for all cases.

"Nature has cast each of us in a different mold, and to attempt deliberately to alter the type of the face is presumptuous."

"The practitioner tends to look at extractions as an 'easy way out' whereas, in reality, it will frequently be found to complicate the treatment of a case."

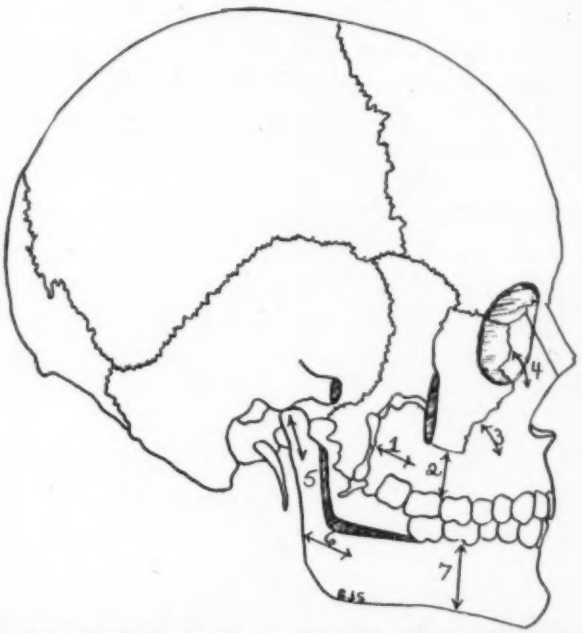


Fig. 1.—Profile view of skull showing main sites of growth in maxilla and mandible. *1*, Growth at the maxillary tuberosity translated forward from the pterygomaxillary junction. *2*, Growth at the alveolar process. *3*, Growth at the zygomaticomaxillary suture. *4*, Growth of the maxillary process in the floor of the orbit. *5*, Growth at the head of the mandibular condyle. *6*, Growth at the posterior border of the ramus. 7,Growth at the alveolar process. (From Salzmann, J. A.: AM. J. ORTHODONTICS AND ORAL SURG. 31: 181, 1945.)

J. A. Salzmann[2] points out that we deal with "two intimately associated structures of different embryological origin: (1) the teeth, ectodermal in origin, which 'achieve' adult dimensions early in childhood and (2) the jaws, of mesodermal origin, which take almost twenty years to complete their growth."

"It is readily understandable that postnatal growth is influenced by environmental factors of a developmental, functional, and pathologic nature. It is not surprising, therefore, that the jaws do not always achieve sufficient growth to accommodate the arrangement of all the teeth in an occlusion which meets or even approaches the so-called normal from the morphologic, physiologic, and esthetic point of view."

A study of profile view of skull (Fig. 1), showing main sites of growth in maxilla and mandible, should prove of interest.

Salzmann differentiates between the normal forward translation as a result of growth and the forward translation of only the tooth-bearing alveolar process in relation to the medullary bone, and concludes therefrom that deficient genetic growth results in a "constricted apical base." He also states that if general muscle tone is poor, typical bimaxillary protrusion is evident, while, if muscle tone is good, then crowding and/or impaction of teeth is severe.

This explains, in part, why Tweed and others claim that many cases are actually bimaxillary protrusions even though they do not exhibit typical protrusive features but which cases, if "rounded out," will be transformed into the protrusive type for which they were bound, but were kept in check by the abnormal muscle balance.

George R. Moore[7] believes that, in cases of maxillary protractions of the hereditary type, the extraction of the upper second molars and quick distal movement of the first molars and premolars is indicated. The upper third molar, if properly situated, will drop into the place of the extracted second molar. This seems a very logical procedure and it would bear giving it a trial by more men.

Will McLain Thompson, Jr.,[8] states: "It appears that we have for years been attempting to place a normal occlusion or a normal amount of tooth material into the faces of children with subnormal growth patterns."

Broadbent states that bimaxillary protrusion actually represents a dwarfed skeletal structure. "In other words, the condition and appearance is due more to the retarded facial skeleton than to the dentition being too far forward in relation to the cranial base."

From Broadbent's studies it appears that the retarded eruption of the third molars as well as crowded anterior teeth are "co-sufferers resulting from the failure of the facial skeleton to attain its complete adult size and proportion."

From the foregoing statements we gather the fact that there is much to be said in favor of either side of the controversy. One can find enough statements in orthodontic literature, written by equally great men, to build up a defense of either side. Although Hellman and Tweed represent the extremes of this controversy, there is a great deal of good orthodontic sense in both presentations. Neither one of the two extremes need be followed exclusively until further clinical evidence is presented. Hellman, holding to the nonextraction orthodox plan of treatment, should keep in check those of us who might fanatically follow Tweed's philosophy. We believe that a moderate course is the better choice.

It should be our aim to treat the majority of our cases without resorting to extractions. It would be well to bear in mind what Delebarre said in 1815: "It is much easier to extract teeth than to determine whether it is absolutely necessary."

It is quite possible that the many failures, to which some men are so bravely willing to attest, may have been due to the fact that their practices have been guided by the erroneous policy of delaying treatment until the second molars have erupted.

They have thereby "aided and abetted" the aggravation of the case and probably wound up in treating a much more difficult malocclusion than they would have had to if early orthodontic intervention had been instituted. Fig. 2 shows a case aggravated by a five-year delay in instituting treatment.

After studying for a period of years a large number of nontreated cases, Edward I. Silver[3] has concluded that very few cases of distoclusion ever correct themselves.

Fig. 2.—Untoward result of five years of waiting for self-correction.

Early treatment during the mixed dentition stage with its period of accelerated growth presents very favorable circumstances for the correction of incipient malocclusions. In this manner we remove impediments to normal growth and development. The objective of this limited treatment is to bring about a condition which, according to accepted standards, would be considered normal for the patient's physiologic rather than chronologic age.

Early treatment may consist of any or all of the following corrections:

(a) Widening of the upper cuspid area, thereby removing the impediment to the forward development of the mandible and permitting the masseter-temporal muscle group to develop and function normally.

(b) Reduction of protraction of the anteriors, thereby permitting normal unimpeded development of the orbicularis oris, which, in turn, affects the tonicity of the muscles attached to it.

(c) Correction of first molar interdigitation; if upper molars are found to be placed anterior to the "key ridge," they are carried distally; if they are correct in relation to the cranium, the forward movement of the mandible is induced, until the molars are established in good interdigitation.

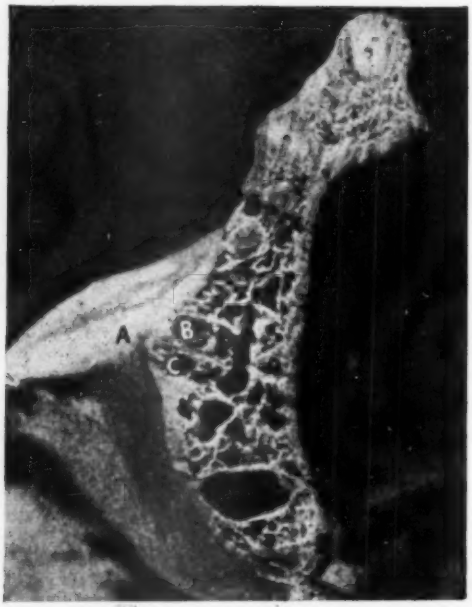


Fig. 3.—Horizontal section showing abundance of cancellous bone in molar area. (From Atkinson, Spencer R.: J. Am. Dent. A. 24: 560, 1937.)

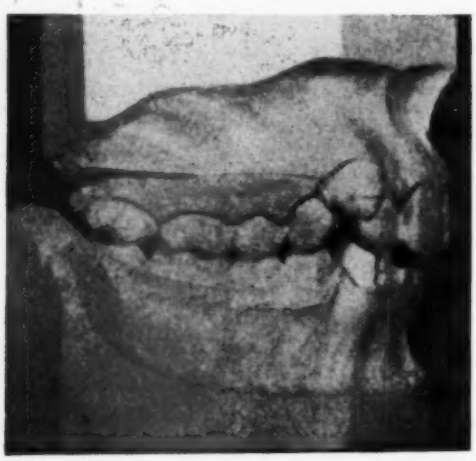


Fig. 4.—The Philosophy of Segmental Therapy. (From Atkinson, Spencer R.: J. Am. Dent. A. 24: 560, 1937.)

(d) Correction of deep overbites: after primary impediments are corrected, there may be a severe deficiency in vertical growth; this is usually recognizable by short unerupted lower premolars and by the presence of a pronounced horizontal ridge running from first mandibular premolar distally, about 2 to 3 mm. below the gingival line. An Oliver guide plane or the usual removable

Hawley with guide plane may be used to induce vertical growth in the posterior area. Of course, concomitant myofunctional therapy, especially that of the masseter-temporal muscle group should be instituted, if stability of results is to be insured.

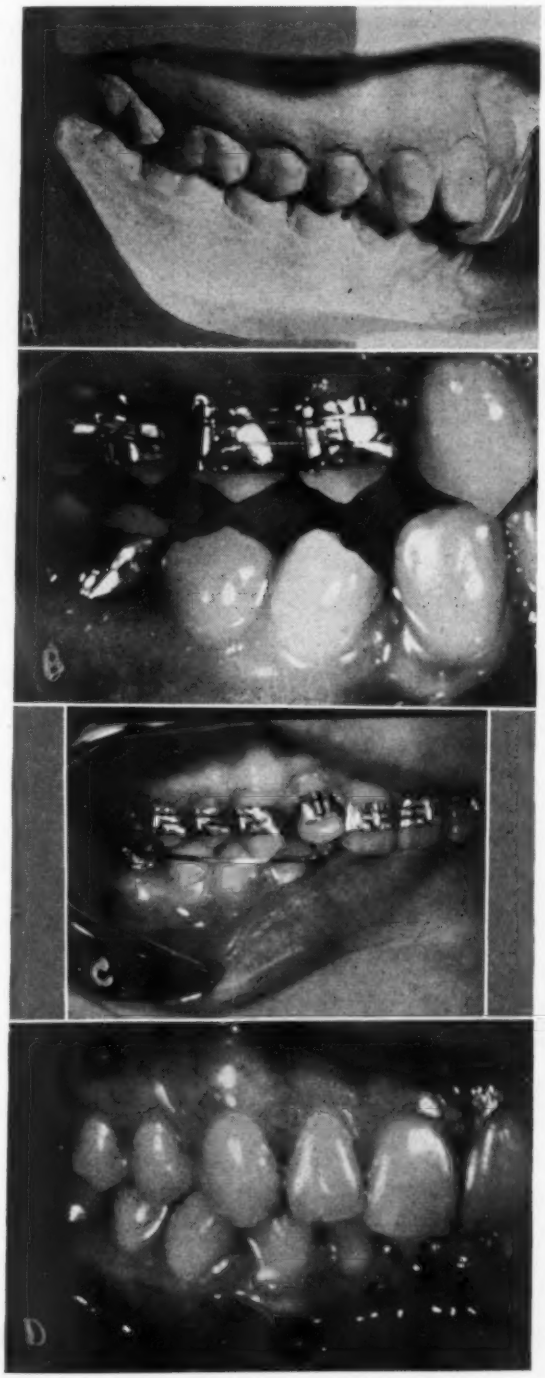


Fig. 5.—Atkinson segmental therapy for distal movement of premolars and molars en masse.

(e) Leaning habits, lip biting, tongue and posture habits should be corrected as early as possible.

Another stumbling block for a certain group of orthodontists may have been the fact that, with the technique employed, they found it difficult to move lateral segments distally. However, those who have taken advantage of the teachings of Atkinson and Johnson have been able to move the upper premolars and molars distally without too much difficulty.

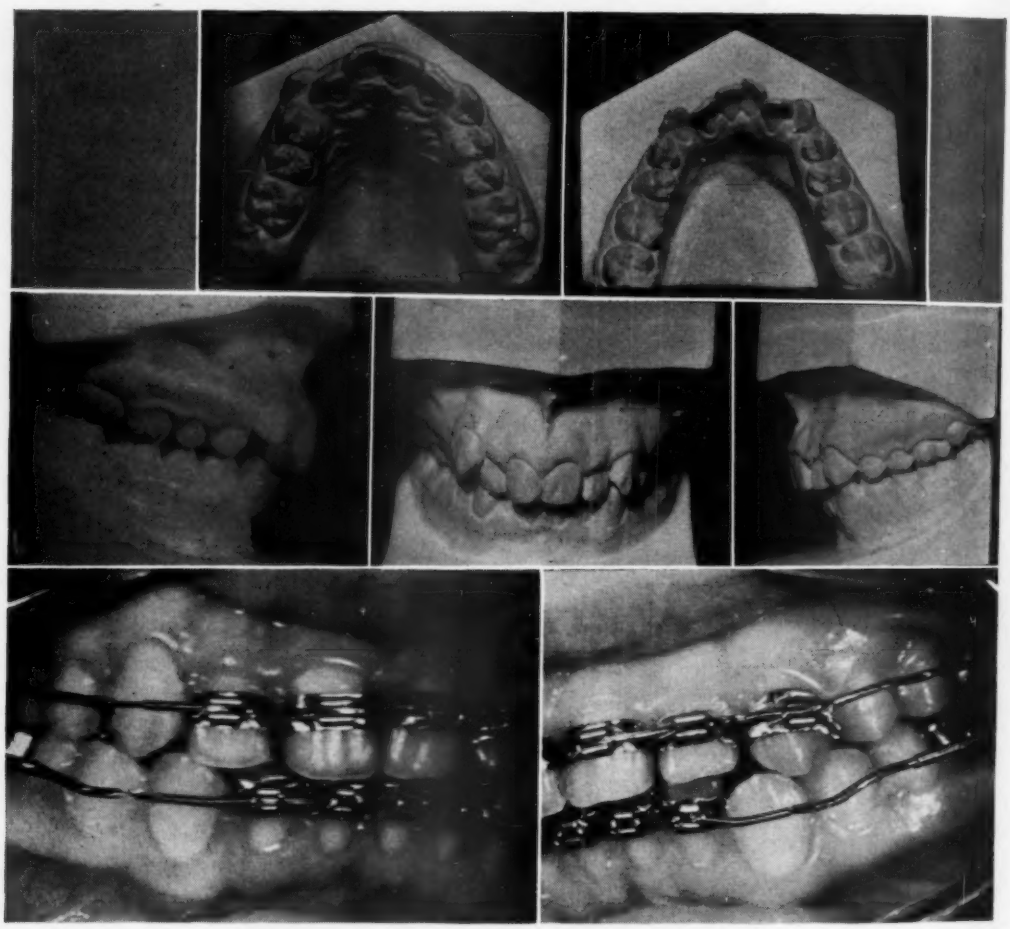


Fig. 6.—*a* and *b*, Borderline case which might be considered a candidate for premolar extraction but which responded well to segmental therapy; *c*, segmental therapy, no extractions; satisfactory results.

Atkinson[9] states: "If the forward relationship of the molars is recognized, these teeth may readily be retruded through the cancellous bone lying between the lingual and buccal cortical plates. Normal cancellous bone is rich in marrow and has abundant circulation desirable for facile bone change." (Fig. 3.)

Fig. 4 shows how Atkinson demonstrates the rationale of en masse retruding of premolars and molars. "The cuspid and lateral will drop into place when misplaced buccal segment is moved posteriorly to proper position in relation to key ridge."

Fig. 5, *a* shows case requiring segmental therapy.

Fig. 5, *b* shows method used in banding the premolars and molars for distal movement en masse. The result obtained is shown in Fig. 5, *c*.

Fig. 5, *d* shows case two years after all appliances have been removed. No relapse has occurred.

Fig. 7.

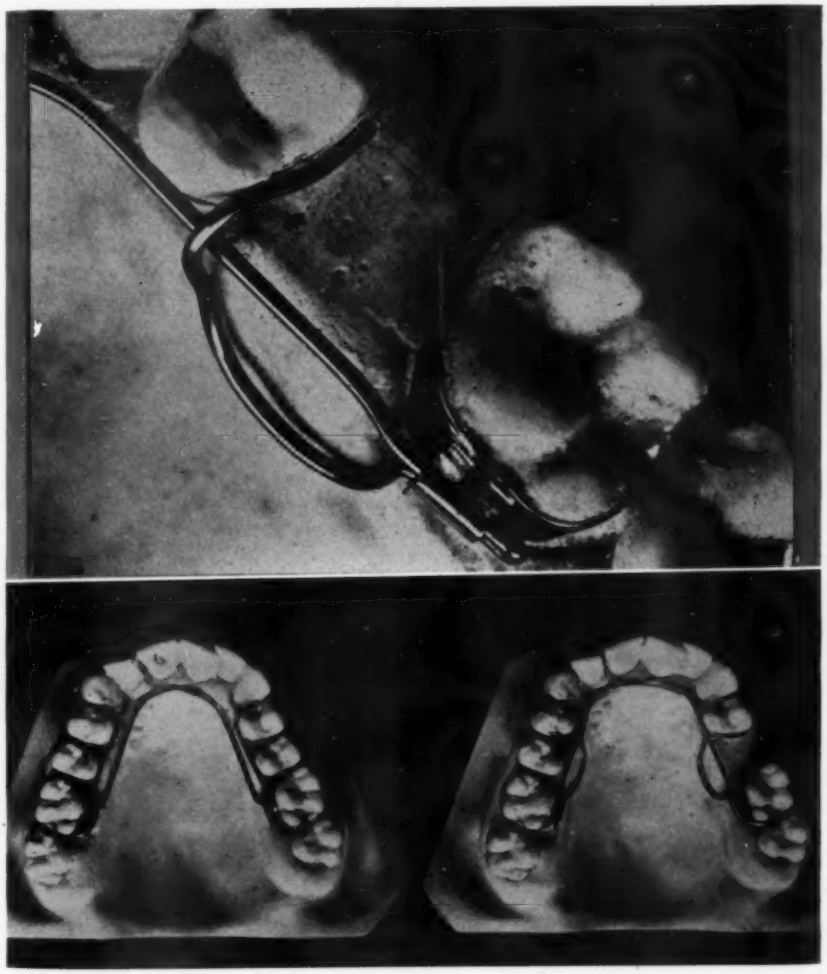


Fig. 8.

Fig. 7.—Atkinson lingual attachment, permitting distal movement of molars without the impediment offered by the usual vertical-post lingual. (C. F. Stenson Dillon.)
Fig. 8.—Atkinson lingual appliances. (C. F. Stenson Dillon.)

Fig. 6, *a* and *b* show a similar case, but one that borders on being a case of constricted apical base. This is the type of case where the orthodontist might as well give the patient the benefit of the doubt and, before deciding on extractions, institute conservative treatment. The segmental therapy was employed with the result shown in Fig. 6, *c*.

These cases show that, where basal bone is sufficient in size, blocked-out cuspids and crowded anteriors can be corrected by employing the segmental therapy of retruding the misplaced buccal teeth.

Another reason for "failures" may have been due to the fact that some practitioners failed to avail themselves of the benefits that can be derived from the use of a lingual appliance, be it Mershon, Atkinson, or Johnson.

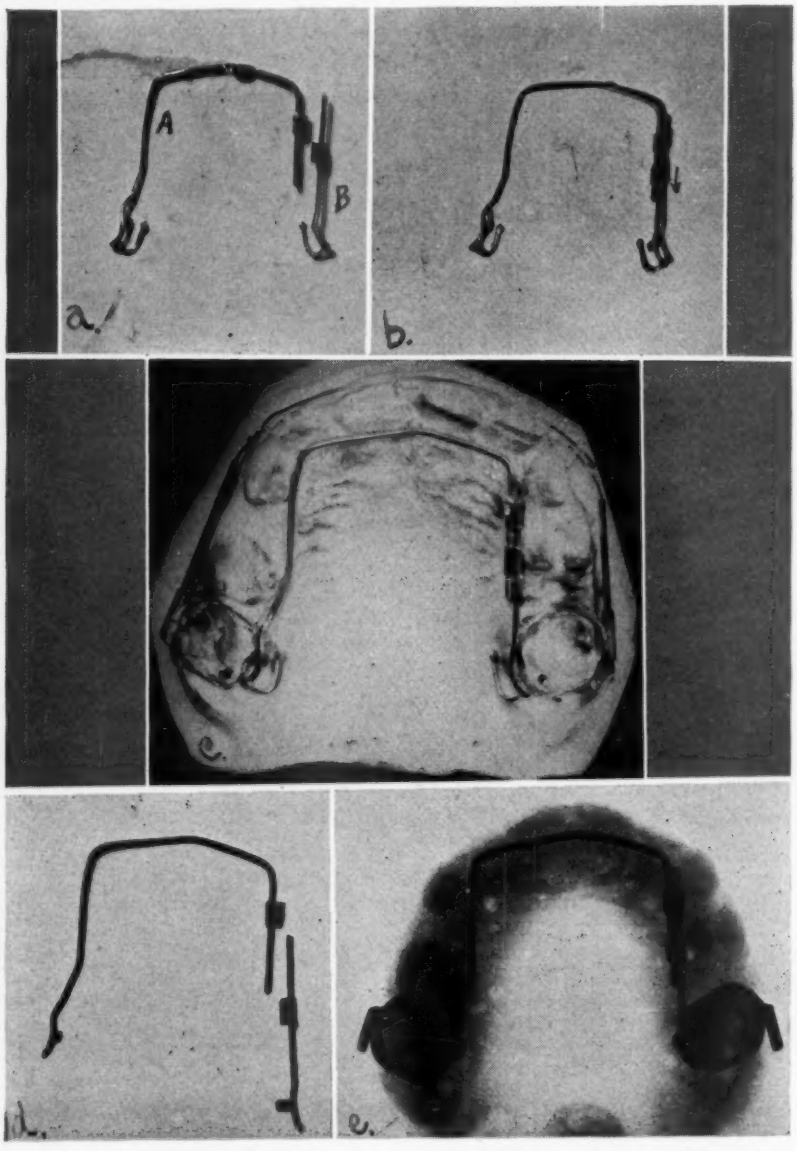


Fig. 9.—*a*, Modified Mershon lingual to allow for distal movement of molars while at the same time keeping them, by expansion, within cancellous bone. One Ellis tube is soldered to the lingual (*A*) and another to the segment (*B*) in such a manner that the segment (*B*) will slide distally unimpeded. *b*, Split lingual in working position. Arrow shows direction of movement. *c*, Split lingual on model. *d* and *e*, Prints from x-rays taken of split lingual on model and by itself.

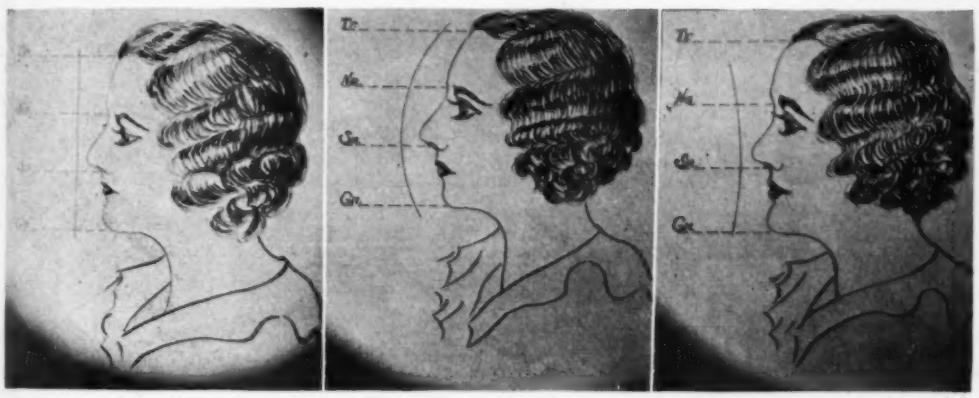
Those employing a lingual appliance for many years have found great satisfaction and obtained stable results, even in cases requiring extensive expansion. The lingual appliance affords the use of a gentle, continuous force, which the tissues seem to tolerate in a gratifying manner. One sees little luxation of teeth and the gums remain pink and hard throughout treatment. This

is not always the case when traction or pulling force is used by means of almost any labial. The "pushing" force seems more compatible with the physiologic limits of tissue repair.

Since the majority of our cases require some lateral expansion, some form of lingual appliance should be a "must" in the armamentarium of every orthodontist.

During the distal movement of lateral segments, the molars need to be guided and kept within the cancellous bone, otherwise they have a tendency to drift lingually or palatally. A lingual appliance, such as the Atkinson lingual, is best suited for this purpose. Figs. 7 and 8 show the Atkinson lingual attachment, permitting distal movement of molars, without the impediment offered by the usual vertical-post lingual.

For those using the Mershon lingual, a split lingual, as described below, may be used to advantage.



a. *b.* *c.*

Fig. 10.—The three composite types of individual normal physiognomy. *a*, Straight, *b*, convex, and *c*, concave. (C. F. Stenson Dillon.)

This appliance is constructed according to the original Mershon idea of making the arch in two parts. The modification consists of making the "working segment" short, only up to the cuspid, while the longer, "stabilizing end" is made to extend to the distal of the second premolar. (Fig. 9, *a*.)

Construction of the appliance consists of soldering one 0.036 Ellis tube to the long end (*A*) and one to the short segment (*B*) while the body wires are kept perfectly straight to allow for the easy sliding of the "working segment" (*B*). Arrow on Fig. 9, *b* shows direction of unimpeded travel of working segment. Fig. 9, *c* shows appliance on model. A more graphic illustration of this appliance may be seen in Fig. 9, *d* and *e*, which are prints made from x-rays.

While the usual vertical-post lingual impedes the distal movement of molars, especially in unilateral cases, the split lingual permits retrusion of molars while, at the same time, allowing us to guide and keep the molars within cancellous bone by applying expansion adjustments, as the teeth move distally into wider areas.

Another cause for "failures" may be due to the inattention given to the correction of pernicious habits. Various leaning habits, sleeping habits, lip and

cheek biting, finger sucking, and bad posture have been shown to cause many malocclusions. They remain a deterring factor during active treatment. Atkinson[9] states that if we would check back on our relapses, we would find that, in most cases, some pernicious habit has remained active.

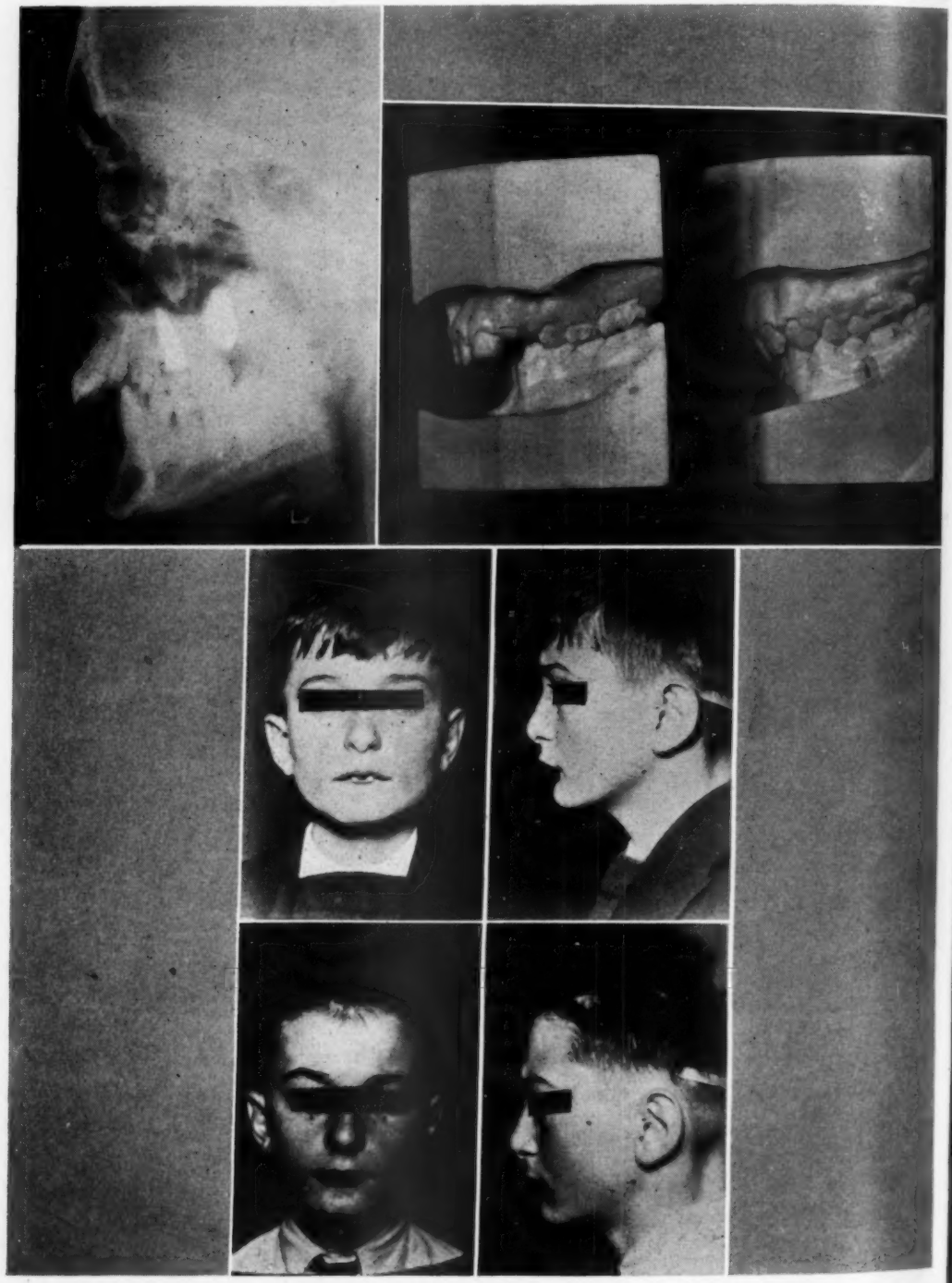


Fig. 11.—Extreme lower alveolar retraction. Satisfactory results with conservative treatment.

The attempt to mold, by orthodontic means, all faces into the ideal type may be another reason for the many so-called failures. Just because the patient's face does not turn into that of a Venus or an Adonis does not mean that the orthodontic treatment is a failure.

Brodie[1] states that it is presumptuous to attempt to change the individual normal pattern.

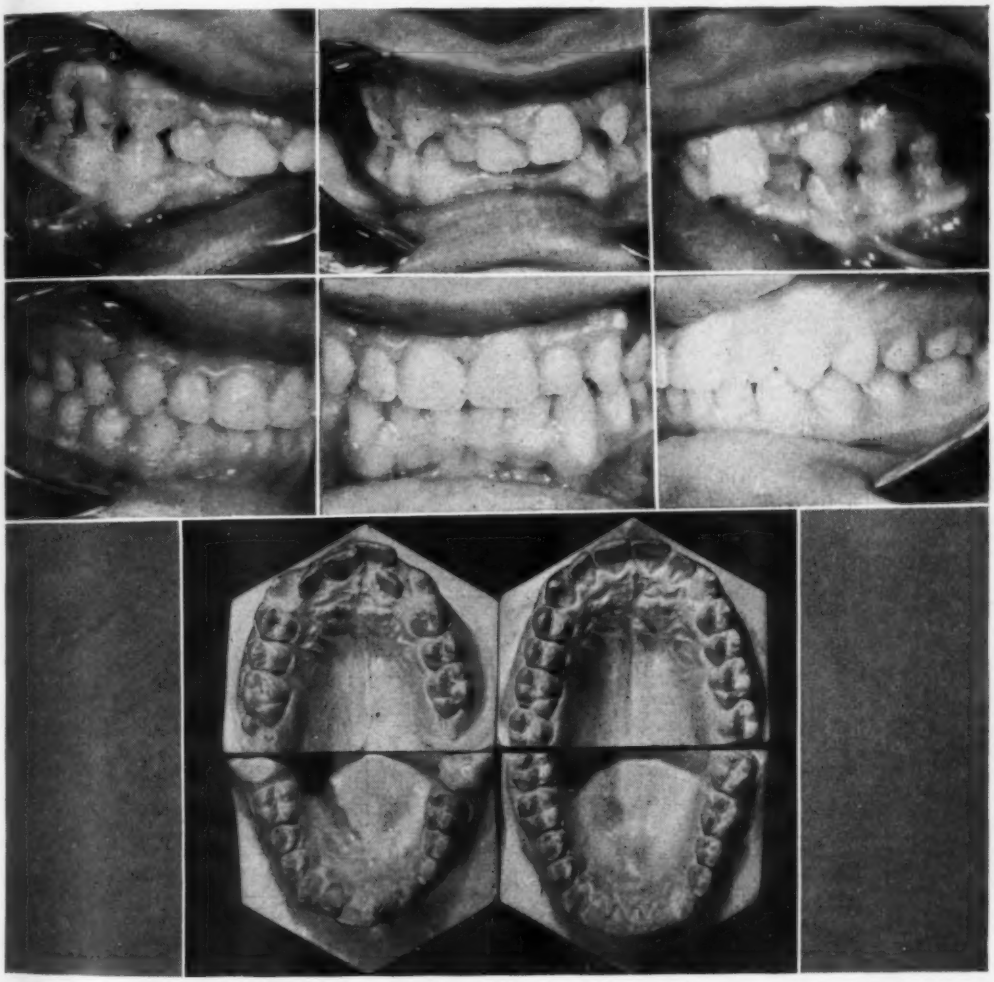


Fig. 12.—*a*, Case where mesial drift of lateral segments blocked out the cuspids and upper left lateral in lingual version. *b*, Conservative treatment employed; lateral segments were moved distally and anteriors lined up. *c*, Left, broad base of well-developed basal bone. Right, after treatment, full complement of teeth, lined up on ridge, with sufficient bony investiture.

C. F. Stenson Dillon divides normal physiognomy into three types of faces: (a) straight, (b) convex, and (c) concave. (Fig. 10.)

The orthodontist should not attempt to change the convex or concave type to the straight type, unless he wishes to invite a relapse after treatment.

From the foregoing, it may be reasoned that failures or relapses may have been due not so much to the procedures employed, but more to the lack of attention being paid to improvements and refinements in the various techniques

and philosophies and to the lack of so combining the many good points in the new procedures that a composite multideveloped modus operandi be instituted, which is at once rational and progressive.

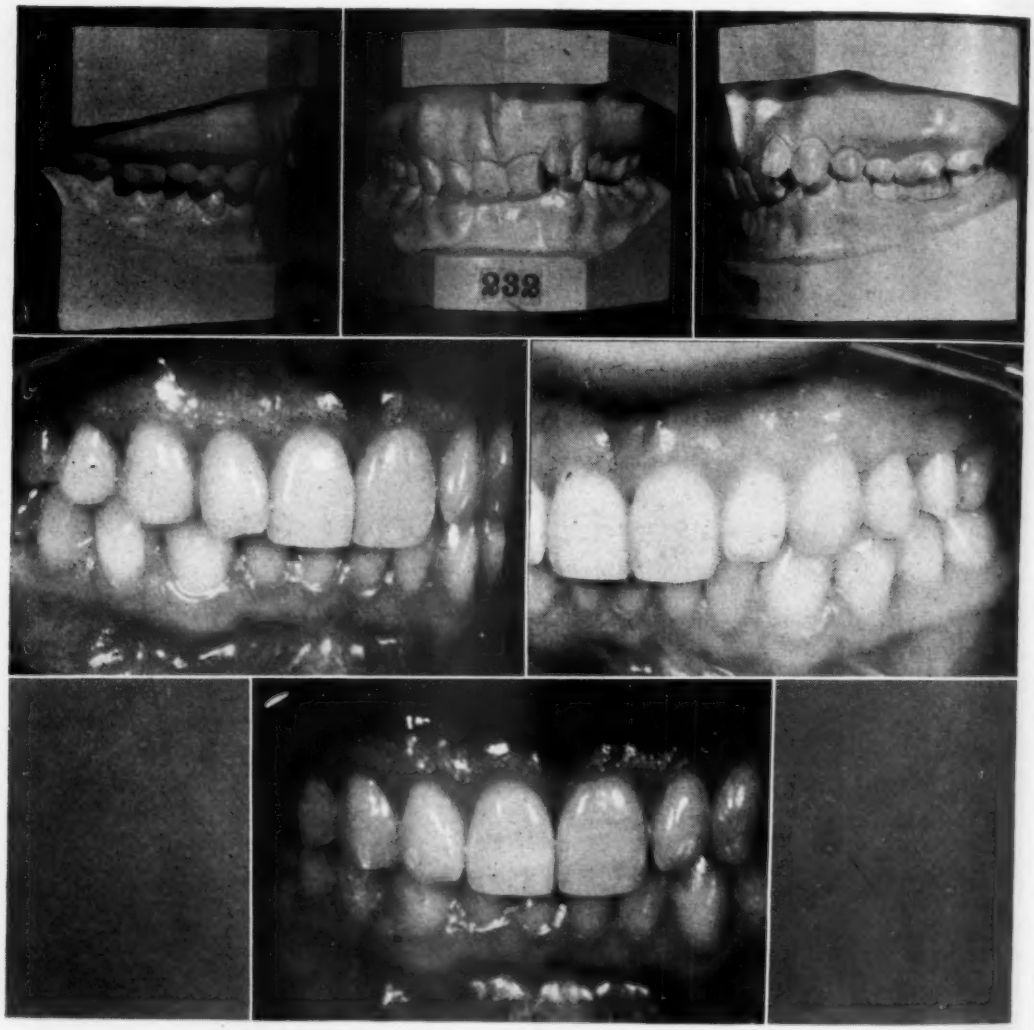


Fig. 13.—*a*, Extreme overbite, upper lateral segments mesial to normal. Atkinson segmental therapy employed to carry premolars and molars distally en masse. *b*, Intraoral views two years after all appliances were removed. Case is stable, no relapse.

Among these philosophies and procedures may be listed:

a. Early treatment.
b. Habit correction.
c. Recognition of pattern of growth limitations.
d. Nonconfinement to "one and only" procedure.
e. Incorporation of advantageous features of other techniques.
f. Rational and progressive modus operandi.
g. The appliance adapted to the case, and not the case fitted to the appliance.
h. Tolerance of the other man's viewpoint.

Clinical experience has proved, through the years, that the majority of our cases may be treated successfully by using conservative methods.

Fig. 11 shows model and photograph of a severe case treated with the labiolingual appliance. The result obtained was satisfactory both as to occlusion and esthetics. It should be noted that the teeth are on the ridge. No extractions were resorted to.

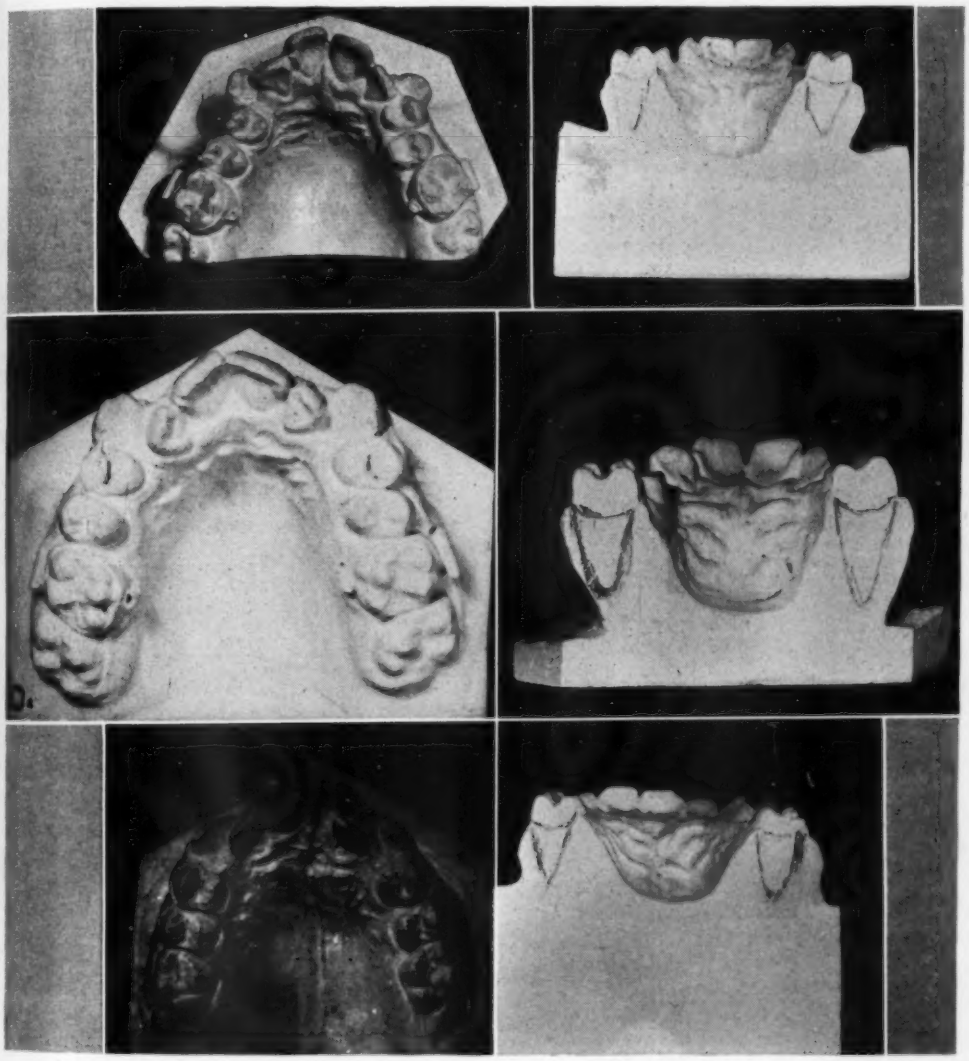


Fig. 14.—*a* and *b*, Left, models of cases with constricted apical base. Right, cross sections through premolar areas of the same casts. Proximity of roots to cortical plates precludes bodily movement of premolars. Insufficient medullary bone indicates need for extraction of some dental units. *c*, Left, wide alveolar process with broad basal bone underlying it. Ideal for expansion. Right, ample cancellous bone present between roots and cortical plates will permit for facile bodily movement of premolars.

Fig. 12, *a* depicts a case where a mesial drift of molars and premolars has blocked out the erupting cuspids; anteriors are in torsiversion and the upper left lateral incisor is crowded out.

The lateral segments were carried distally and the anteriors were lined up. Johnson twin wire was employed in conjunction with Mershon lingual. (Fig. 12, *b*.)

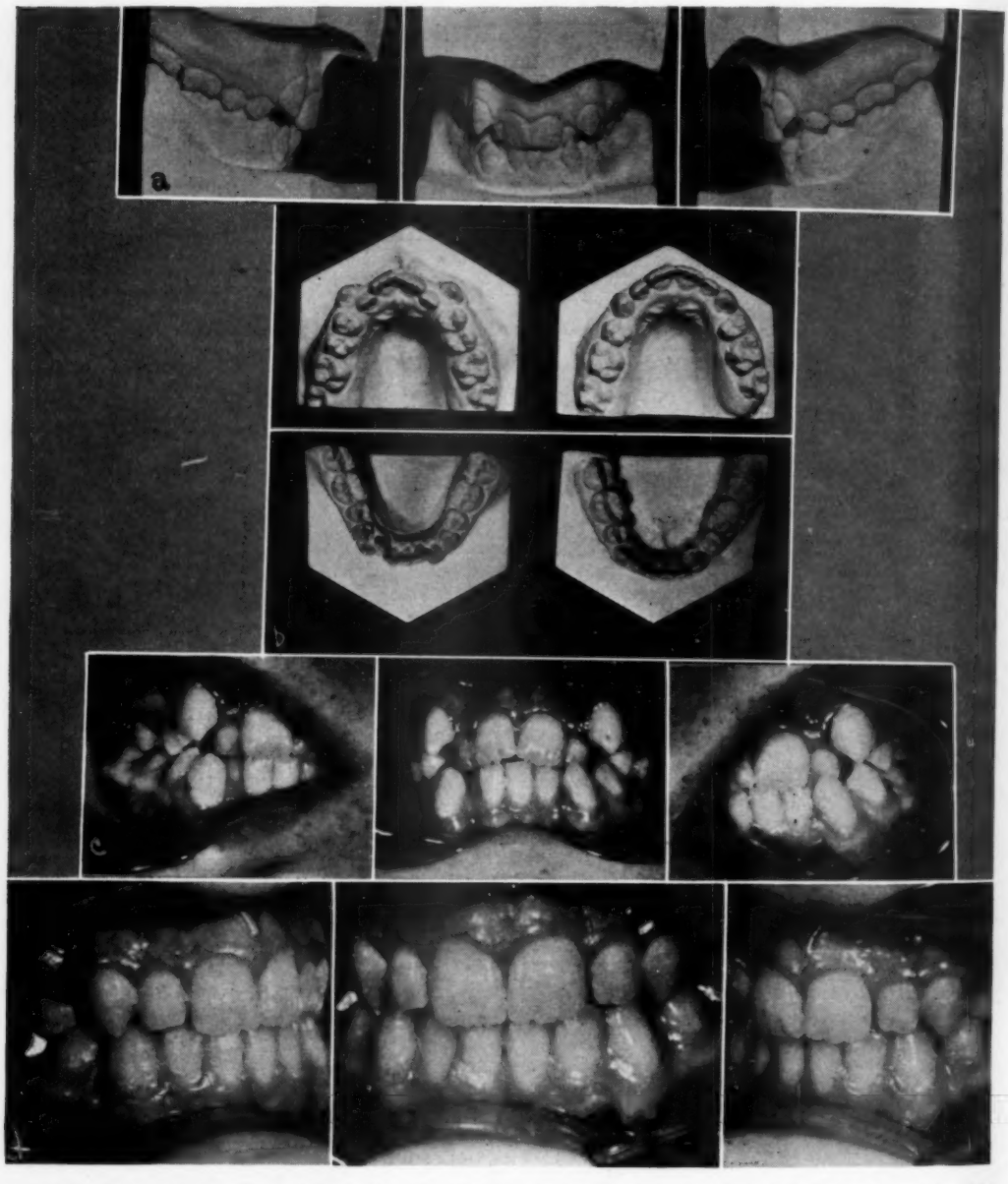


Fig. 15.—*a*, Pseudoneutroclusion, female, aged 13 years, 4 months. Blocked-out cuspids and crowded anteriors. *b*, Occlusal view shows insufficient medullary bone to accommodate all the teeth. *c*, Intraoral views before treatment. *d*, Intraoral views after eighteen months of treatment. Bodily movement obtained by employing the vertical double hook. *e*, X-rays of case showing correct axial position of cuspids and good proximal contact.

Occlusal views before and after treatment show well-developed basal bone. Relapse is unlikely as all teeth have sufficient bony investiture. (Fig. 12, *c*.)

Fig. 13 shows another case of mesial drift of lateral segments. In this case the Atkinson segmental therapy was employed to retrude the premolars and

molars en masse. Intraoral views taken two years after appliances were removed show no relapse. (Fig. 13, *b*.)

These cases are shown as evidence that cases requiring a great deal of expansion as well as distal movement of lateral segments will, if treated properly, maintain themselves and very little, if any, relapse may be expected.

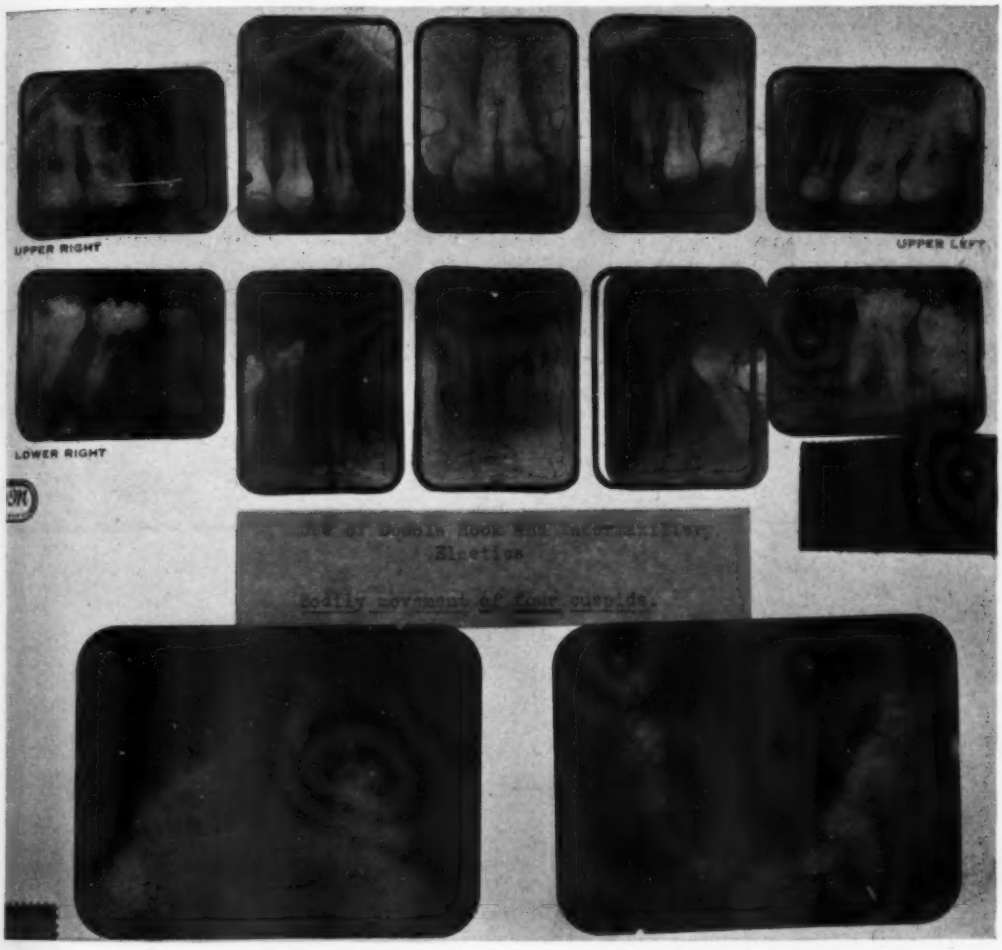


Fig. 15.—*e*, (*For legend, see oppposite page.*)

These successful results were due, in large part, to the fact that the basal bone was of sufficient size to accommodate the full complement of teeth. However, there are many patients, especially those in their teens, that present quite a disproportion between tooth material and the size of the basal bone. Fig. 14, *a* and *b* depict such cases of disproportion between the small underdeveloped basal bone and the number of teeth present. Cross sections of the upper models of these cases in the premolar area show constriction in the basal bone area. The proximity of the roots to the cortical plates leaves little cancellous bone through which bodily movement of premolars could be obtained. Expansion will result in tipping the crowns bucally into a position which, according to clinicians and

theorists, is not stable and has a tendency to relapse. Reduction in the number of dental units becomes the procedure of choice.

On the other hand, Fig. 14, *c* shows the occlusal view of a case with a wide basal bone. The cross section made of this model in the premolar area shows the ample supply of cancellous bone between the roots and cortical plates. This would permit bodily movement of premolars.

Several cases will be shown which, for the lack of a better name, could be called pseudoneutroclusion. Actually, they probably are forward translations of the maxillary and mandibular alveolar processes, associated with strong abnormal muscle tone, the latter preventing the protrusion of the anteriors. Patients are usually in their teens.

The upper first molars are usually anterior to the "key ridge." The cuspal relationship of premolars and molars is usually satisfactory. Conventional methods of general expansion may disturb this nearly perfect interdigitation of the premolars and molars and would probably carry the anteriors off the basal bone. The result would be unstable, especially since the "abnormal muscle balance" will continue to adversely affect the growth and development of the alveolar bone and may cause a relapse.

The removal of a premolar in each quadrant should be the procedure of choice and would prove more conservative than the orthodox treatment of expansion. The cuspids are to be moved bodily to proper proximal contact with the second premolars, and the anteriors are to be lined up.

Fig. 15, *a* is an example of such a case. Note the case is in neutroclusion, but actually the four lateral segments have drifted mesially. All four cuspids are blocked out and both the upper and lower anteriors are crowded. There is a definite discrepancy between the size of the basal bone and the number of teeth to be accommodated (Fig. 15, *b*).

The patient, female, was over thirteen, and was informed that the four first premolars would have to be removed in order to get a stable result. Fig. 15, *c* shows intraoral views of case before treatment was started. Fig. 15, *d* shows case after eighteen months of treatment. The cuspids have been moved distally by means of elastic force and the vertical double hook which will be described later on. Fig. 15, *e* depicts x-rays of case showing correct axial position of all cuspids due to the fact that they were moved bodily and not tipped.

Fig. 16 shows another case of pseudoneutroclusion with mesial drift of lateral segments, causing the blocking out of the cuspids, the upper bucally, the lower lingually. Fig. 17, occlusal view of upper, depicts insufficiency of basal bone, definitely incompatible with the unusually large teeth. Conventional procedure of expansion to accommodate all the teeth would have resulted in "toothiness" and the result would be unstable. The patient, female, 19 years of age, was advised to have the upper two first premolars removed. The vertical double hook method was used with results shown in Fig. 18. Intraoral views taken two years after treatment show no tendency to relapse (Fig. 19).

If these cases had received the usual treatment, namely, rounding out of the arches by means of general expansion, the results would have had the characteristics of a bimaxillary protrusion. "We would just change one malocclusion for another," as stated by Tweed.

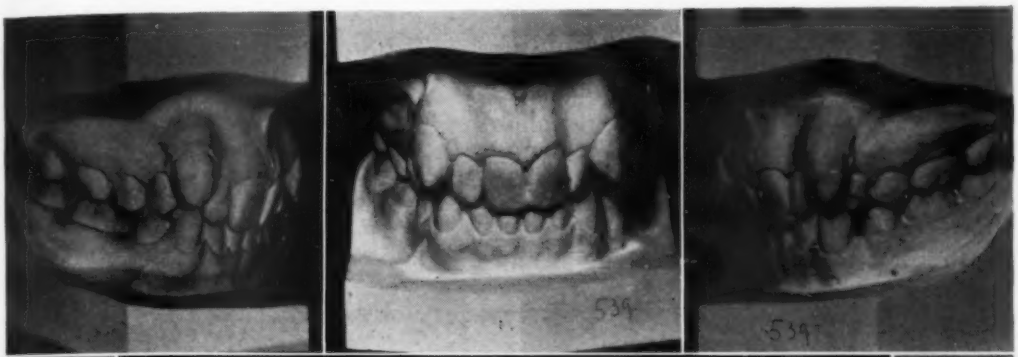


Fig. 16

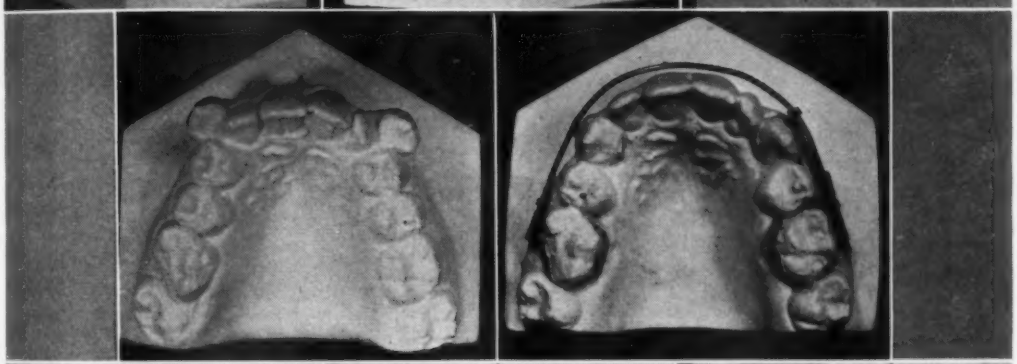


Fig. 17.

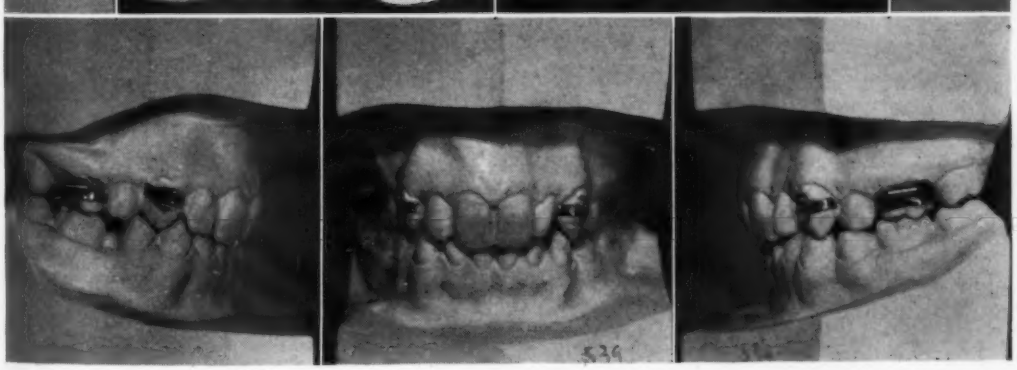


Fig. 18.

Fig. 16.—Pseudoneutroclusion, mesial drift of lateral segments.
Fig. 17.—Occlusal view of upper: left, before treatment showing deficient basal bone; right, after treatment, note symmetry of arch.
Fig. 18.—Models of case after treatment. Cuspids moved bodily by means of vertical double hook.

Another group of cases where reduction in number of dental units is indicated are those with congenitally missing lower premolars or in mutilated cases where one or two teeth have been lost prior to treatment. In most of these cases we find that the spaces have been closed up and the teeth anterior to the space have moved back bodily. The upper teeth are usually crowded, and one or two cuspids may be blocked out; both arches have underdeveloped basal bone.

It would prove impractical to open the space, nor can fourteen teeth in the upper be aligned with twelve in the lower.

Neither does it seem rational to expect any assurance of success if we attempt the bodily movement of eight to ten mandibular teeth. The removal of a corresponding number of premolars in the opposite arch should be the procedure of choice. A stable result may thereby be expected.

Fig. 20 shows a model of a case that is typical of this group. It is important to note that the lower is symmetrical in appearance, the teeth anterior to the space having moved distally and maintained a correct axial inclination (Fig. 21). To disturb this symmetry would be fallacious. We are, therefore, faced with the problem of lining up fourteen teeth in the upper with twelve in the lower. It was deemed advisable to remove two upper first premolars. This would allow the cuspids to assume their correct position in the arch.

Fig. 19.—Intraoral views, taken two years after appliances were removed. Result stable.

Fig. 22 shows the case after fourteen months of treatment. Note bodily movement of cuspids, also depicted in x-rays (Fig. 23). Comparison of arch (Fig. 23) with the original emphasizes the logic of this procedure.

The following cases are of the mutilated type. These were due to the injudicious extractions of mandibular first molars without provision being made to maintain the space. The mandibular teeth anterior to the space usually drift distally and, in case of early extractions, the teeth move bodily and maintain satisfactory axial position.

Fig. 24 depicts such a case. It will be noted that the mandibular basal bone insufficiency would not permit the bodily movement of ten teeth.

The extraction of the upper first premolars seemed the only way to balance the upper teeth with the lower. Fig. 25 shows model of case before treatment. Fig. 26 shows model of case after treatment. Fig. 27 shows intraoral views of case after treatment.

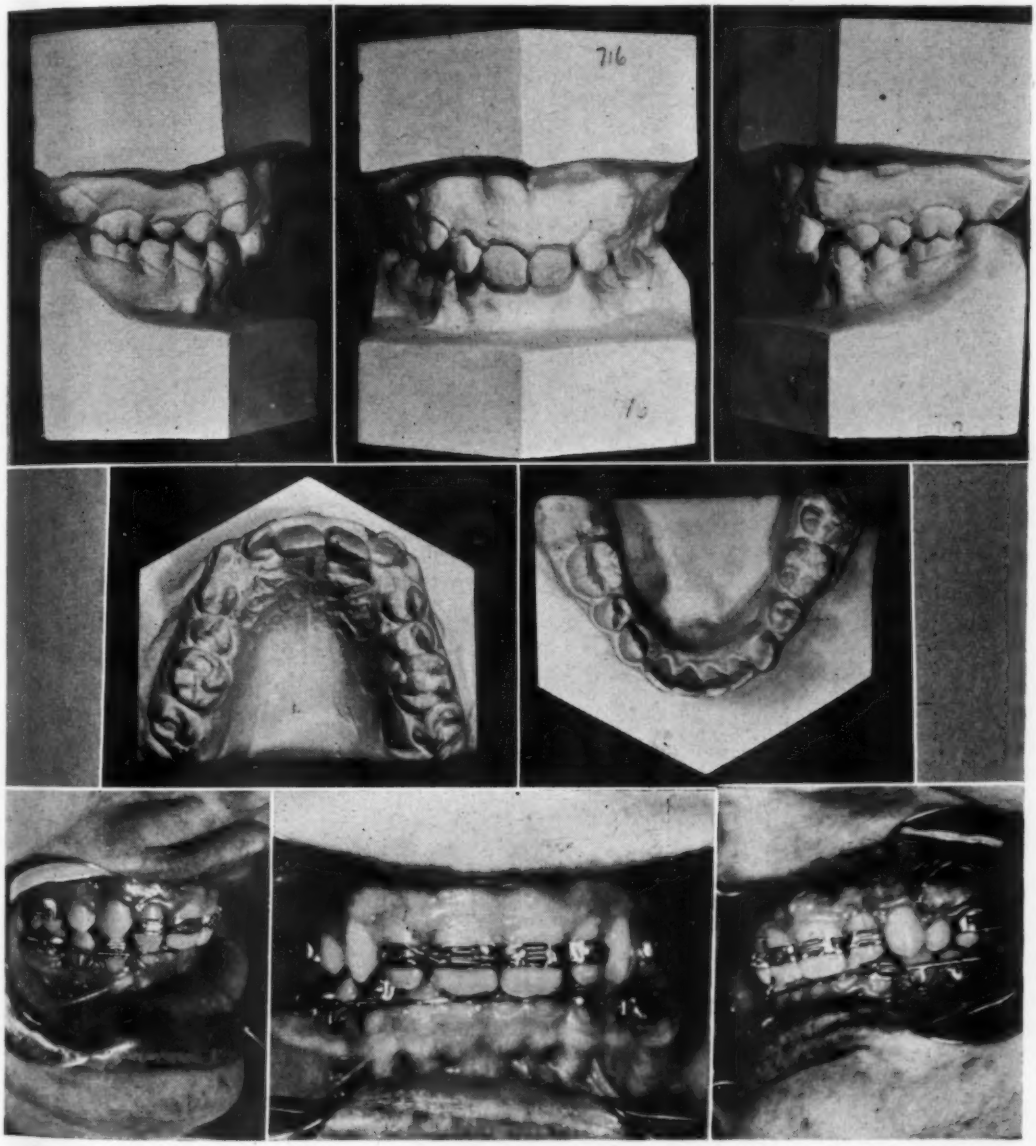


Fig. 20

Fig. 21

Fig. 22

Fig. 20.—Congenitally missing second mandibular premolars.

Fig. 21.—Crowded upper arch, symmetrical lower, space of missing teeth completely closed.

Fig. 22.—Case after fourteen months of treatment. Note bodily movement of cuspid; bite improved.

A similar case, requiring the same procedure, is depicted in Fig. 28. Views on the left are before treatment and those on the right are after treatment. The lower first molars were lost due to decay. The teeth were unusually large

Fig. 23.

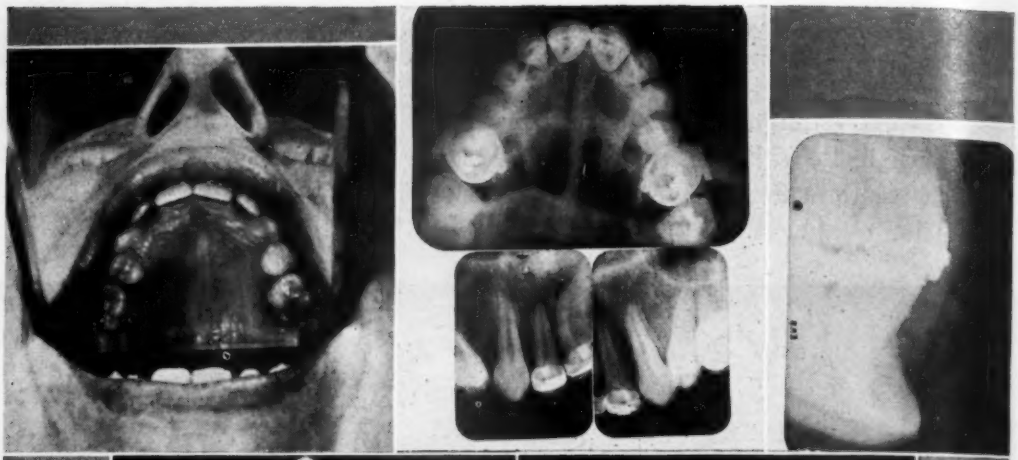


Fig. 24.

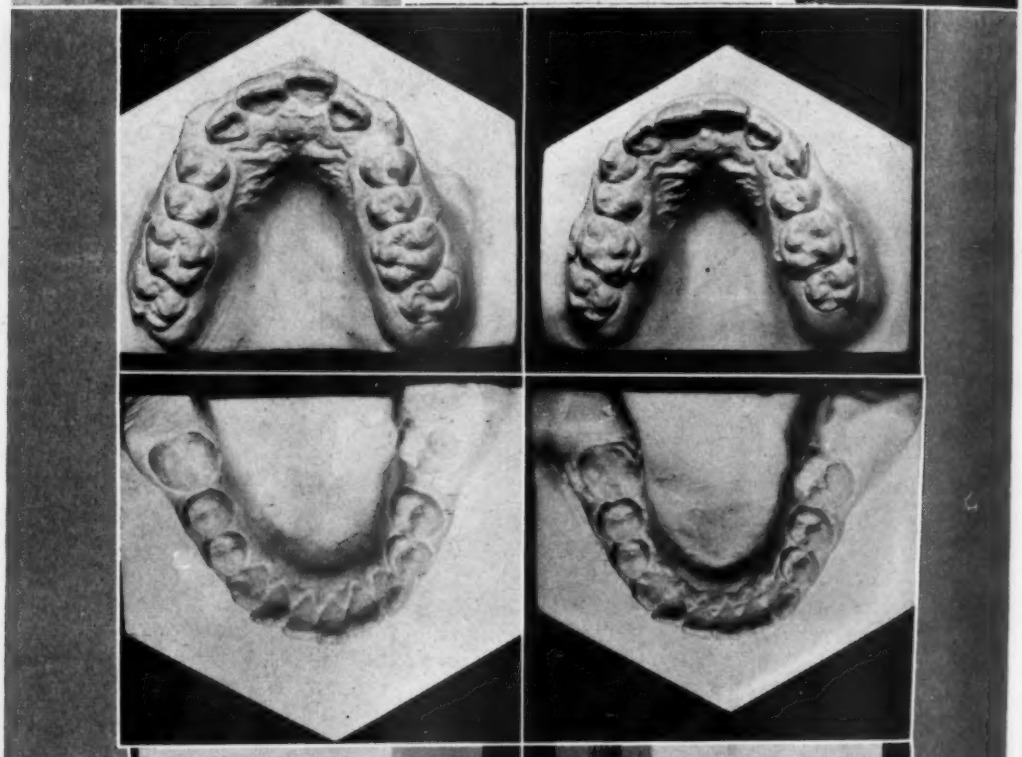


Fig. 25.

Fig. 23.—Symmetry of upper arch, after treatment. X-rays depict bodily movement of upper cuspids.

Fig. 24.—Left, mutilated case. Lower first molars lost due to decay. Insufficient mandibular basal bone. Extraction of upper first premolars indicated. (Right, after treatment, note harmony between size of upper and lower arches.

Fig. 25.—(Models before treatment.) Blocked-out cuspids; lower premolars and cuspids in good axial position.

in size. The extraction of the upper first premolars was the only logical procedure. The result was satisfactory.

Fig. 29 depicts a case in which the lower first molars were lost due to decay. Due to the distal drift of all the lower teeth anterior to the space, the patient developed an extreme protraction in the premaxillary area, associated with crowded and rotated anteriors.

The upper first molars were badly decayed and had pulp involvement (Fig. 31). The extraction of these teeth was deemed advisable. The upper cuspids and premolars were moved distally en masse using the Atkinson segmental therapy. The bodily movement obtained can be seen in Figs. 30 and 31.

Fig. 26.

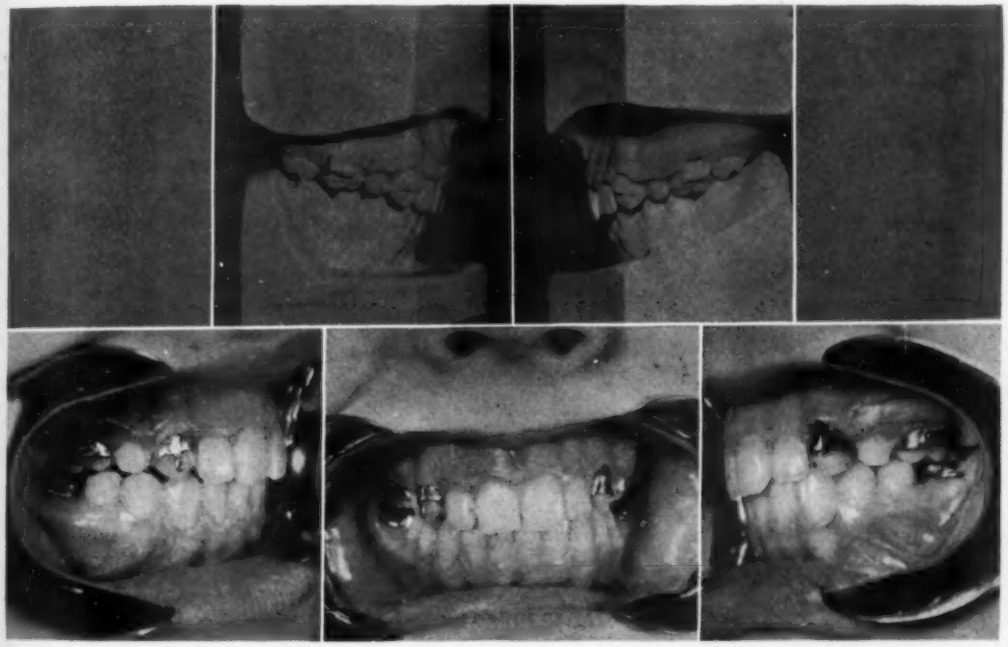


Fig. 27.

Fig. 26.—Model, after treatment, upper first premolars extracted. Note bodily movement of cuspids.

Fig. 27.—Intraoral views, after treatment. Note correct axial position of cuspids. The vertical double hook was employed.

The procedure employed in the bodily movement of cuspids and premolars consists in the use of an inter- or intramaxillary elastic which is stretched from a vertical double hook soldered to a band placed on the tooth to be moved. This vertical double hook is made by bending a 0.022 wire in the form of a "U" and is to be soldered the full height of the band, as seen in Fig. 32.

If the tooth to be moved is in infraversion, such as a blocked-out cuspid placed 3 to 4 mm. above the occlusal level, the case is started with an intermaxillary elastic, stretched from both arms of the hook to buccal tube of lower molar. In this manner, a distal as well as downward movement may be obtained.

When the tooth approaches the occlusal level, the patient is instructed to change to an intramaxillary elastic. Care must be exercised that the patient

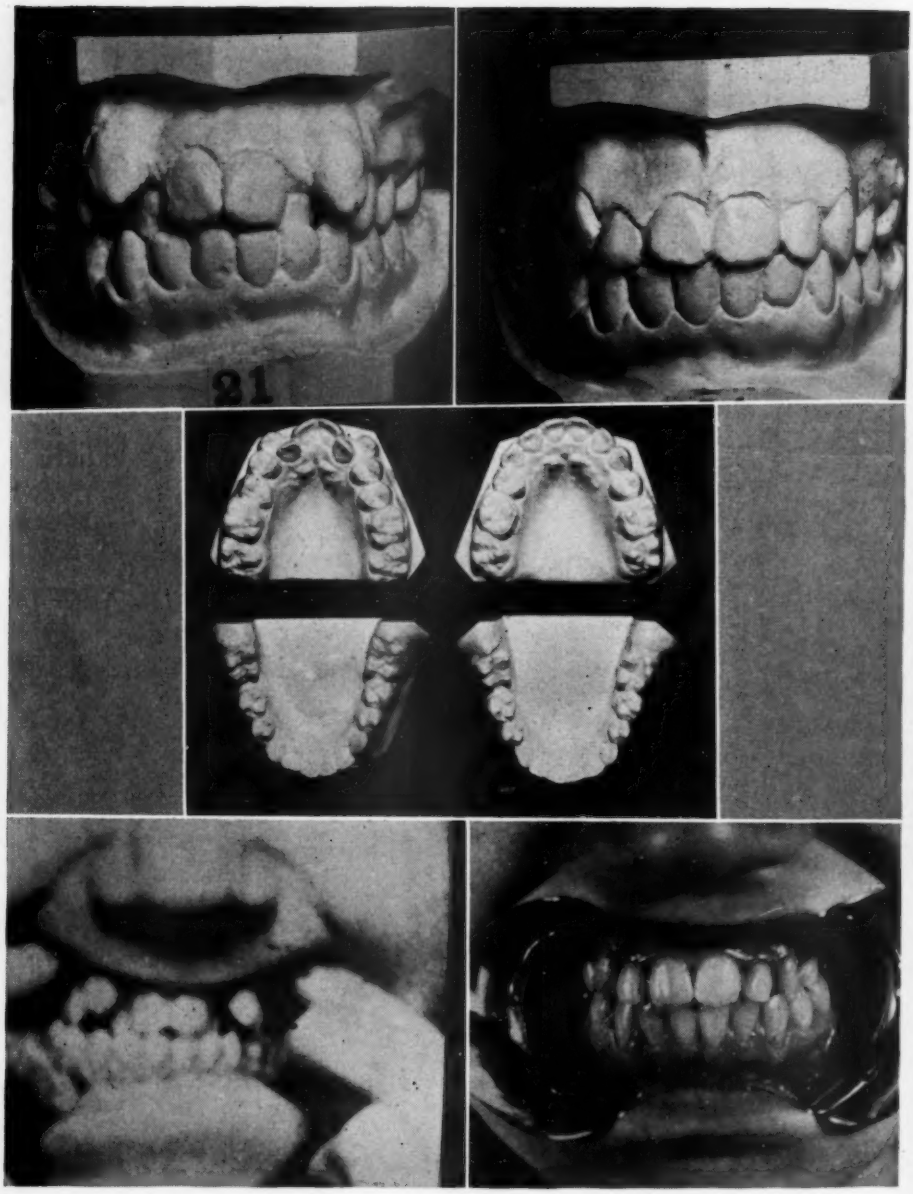


Fig. 28.—Mutilated case. Lower first molars lost due to decay. Insufficient basal bone required extraction of upper first premolars. Left, before treatment. Right, after treatment.

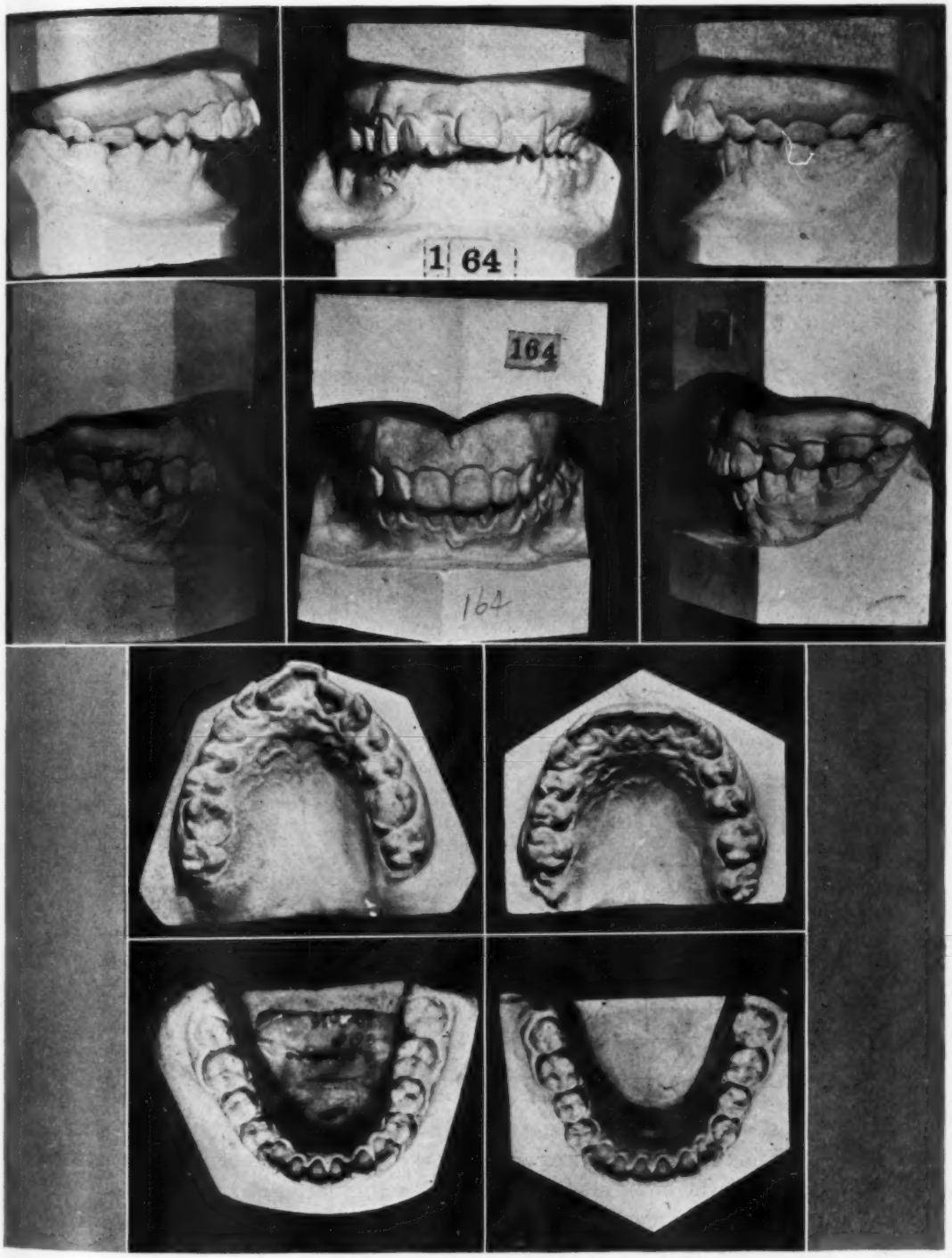


Fig.

Fig.

Fig.

Fig. 29.—Mutilated case, lower first molars lost. Extreme maxillary protraction and crowded and rotated anteriors.

Fig. 30.—Upper first molars removed, cuspids and premolars retruded, anteriors lined up.

Fig. 31.—Left, occlusal views before treatment. Note broken-down upper first molars. Right, after treatment. Note bodily movement of cuspids and premolars. Atkinson segmental therapy employed.

engage both arms of the hook when placing the elastics. This precaution will insure the bodily movement of the tooth involved; otherwise the tooth will be tipped, and the result will be unsatisfactory.

The rationale of the double hook may be depicted in Fig. 33. The base of the triangle formed by the elastic engages both arms of the hook and the force of the elastic is distributed along the long axis of the tooth, and only a bodily movement can ensue.

Fig. 32.

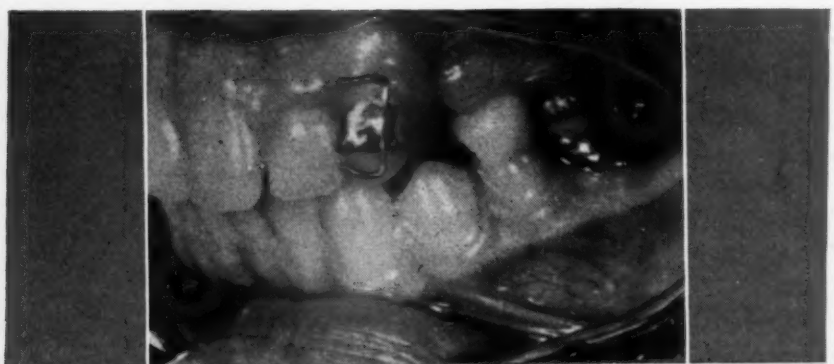


Fig. 33.

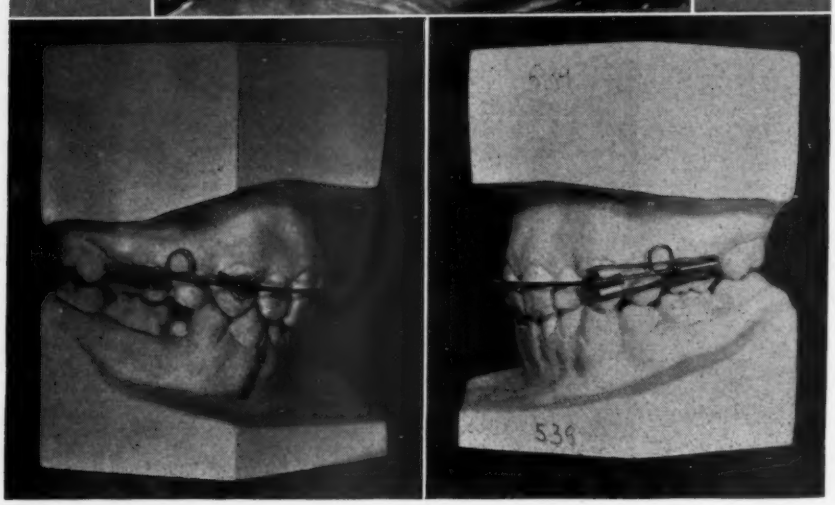


Fig. 32.—The vertical double hook.

Fig. 33.—Vertical double hook. Left, labial used to stabilize anchorage. Right, triangular use of elastic to insure bodily movement.

Fig. 34 shows a case requiring distal movement of cuspids in supraversion.

Fig. 35 shows same case after five weeks of wearing elastics from vertical double hook to lower molars, stabilized with a lingual appliance.

Fig. 36 shows three progressive stages in the use of the vertical double hook. The bodily movement proceeded satisfactorily.

The teeth used for anchorage are to be stabilized by either a labial or lingual appliance.

The molar bands should be cemented and the bands with the vertical double hooks, as well as the appliance, should be ready for insertion before allowing

Fig. 34.

Fig. 35.

Fig. 34.—Cuspid in supraversion. Intermaxillary elastics used for downward as well as distal movement.

Fig. 35.—Five weeks later. Note the amount of tooth movement.

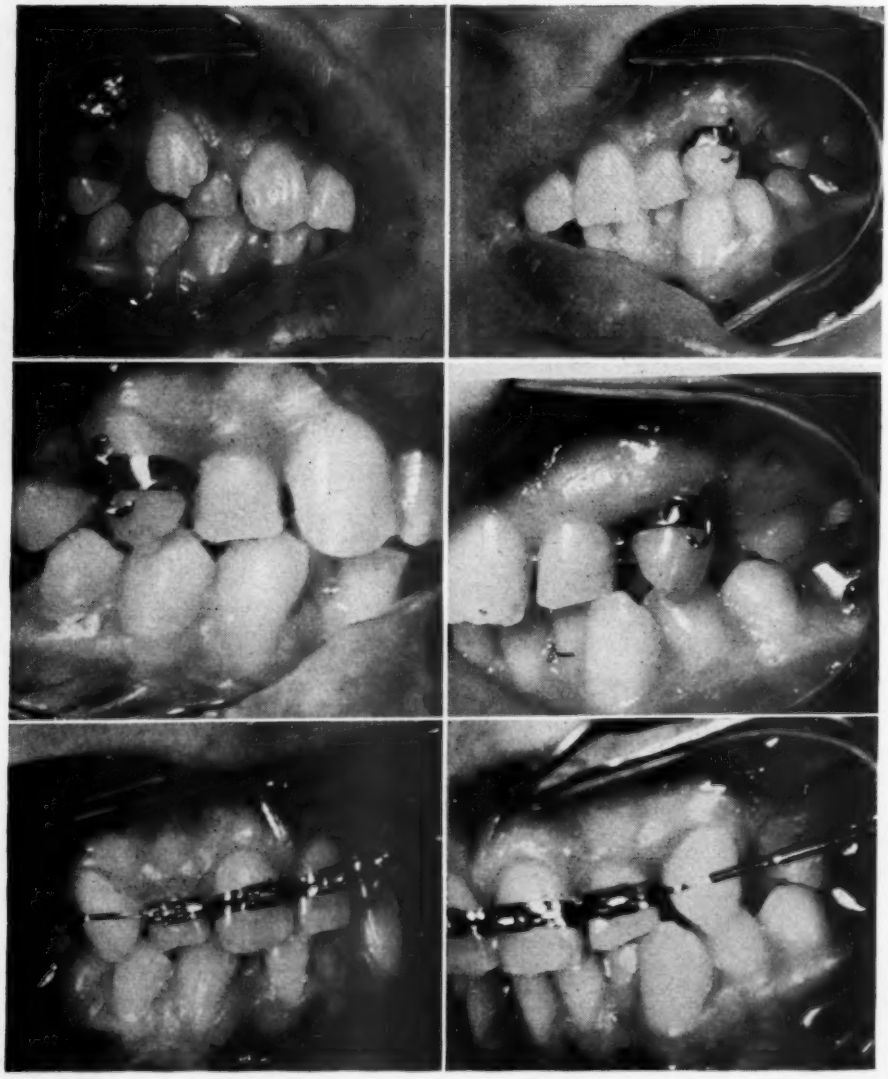


Fig. 36.—The use of the vertical double hook. Progressive stages, few months apart.

Fig. 37.—Constriction of alveolar bone at site of extraction.

the patient to have the premolars removed. Use of elastics should be instituted within several weeks after extraction. Should this precaution be overlooked and the use of elastics unduly delayed, there may occur, especially in the mandible, a constriction of the alveolar bone (Fig. 37). This would make the distal movement of the teeth through this constricted area quite difficult, if not impossible. The surgeon should be cautioned to exercise great care not to damage the cortical plates during the removal of the premolars.

SUMMARY AND CONCLUSION

It may be stated that the "extraction procedure" cannot and should not be considered the panacea of all orthodontic ills. Instead, it should be considered as a compromise to be resorted to only after all considerations have been given to the institution of conventional methods, that is, without extractions.

Judging from the opinions, based upon vast clinical material, of those men who base their plan of treatment on biologic principles and make use of mild forces obtainable through the use of simple mechanotherapy, the majority of the cases should be treated without employing extractions, especially if treated early in the life of the individual.

The answer to the challenge of the extraction enthusiasts lies in the method and approach to treatment; that is, in our ability to treat the malocclusions in their incipiency, and not try to unravel "un fait accompli." Early or primary treatment should not concern itself with minor tooth alignment, but, instead, should aim at the correction of the gross and important features of the malocclusion.

Primary consideration should be given to (a) constricted arches, (b) faulty jaw relationship, (c) faulty muscle development, (d) pernicious habits, and (e) mouth breathing.

In this manner, impediments to normal growth and development would be eliminated early in the life of the individual and, thereby, would allow natural tendencies to be directed toward normalcy in the size of the dental arches.

This, in turn, would be conducive to a better alignment of the individual teeth, even though the primary treatment were not directly concerned with their correction. The irregularities that would have to be treated during the secondary or final treatment would be of a minor character and amenable to simple corrective procedures that could be kept within physiologic limits.

As early as 7 to 9 years of age, the warning signs of severe malocclusion manifest themselves in one or a combination of the following symptoms: protrusive upper, retrusive lower, abnormal development of lip muscle, disturbed masseter-temporal function, mouth breathing, etc. These abnormal conditions, if not corrected, tend to become progressively worse. To allow them to prevail for five or more years until all the permanent teeth have erupted is probably the greatest mistake in orthodontics.

Maxillary protrusion and concomitant mandibular retrusion always cause a deformity of the lip muscle (orbicularis oris) to which are "attached" some sixty-four facial muscles. Poor tone of the orbicularisoris is reflected in an abnormal development of all these muscles resulting in the very Frankenstein that

Tweed now calls "the abnormal muscular balance" and which is now being given as the probable reason for the occurrence of relapses.

By postponing orthodontic interference until after the eruption of the second molars, this "abnormal muscular balance" will remain and act as a deterrent factor to the normal development of both hard and soft tissues of the lower third of the face.

To allow such an untoward force to be active for a period of six to seven years is to invite the development of severe malocclusions.

Early treatment could intercept the progressive development of the so-called "abnormal muscular balance" and thereby eliminate one of the outstanding causes of relapse.

C. W. Carey[10] states: "The greatest opportunity for mandibular development lies in treatment in the primary or deciduous dentition stage, although the management of this treatment and preservation of the advantages gained are not often understood or appreciated by the profession."

Krogman's statement that only 15 to 20 per cent of growth increment remains as avenues of possible readjustment after 5 years of age emphasizes the need for early orthodontic interference which would stimulate the dormant growth potentialities.

In those practices composed mostly of patients under 12 years of age, it was found that extractions were needed in a very small percentage of cases. On the other hand, those orthodontists whose philosophy is to treat cases after the eruption of the second molars find that many of the malocclusions are too far advanced for orthodox treatment.

There are many ill-informed practitioners who indiscriminately advise their patients to wait until the full complement of teeth obtains. Consequently, these postponed cases, which may amount to 15 or 20 per cent of an average orthodontic practice, will require one or more extractions, if a stable result is to be obtained. No one should advise extractions except as an adjunct to orthodontic interference.

Before extractions are decided upon, an exhaustive study should be made from oriented photographs, oriented (gnathostatic) models, and x-rays. When the conviction is arrived at that conventional treatment, that is, without extractions, may result in an eventual relapse, then and only then, should a reduction in the number of some dental units be recommended.

Discrepancy between tooth material and supporting basal bone is one of the main factors to be considered. This is particularly evident in cases belonging to the following groups: pseudoneutroclusion, cases with congenitally missing mandibular premolars, and mutilated cases where lower molars were lost due to caries.

True double protraction may be improved by removing a premolar in each quadrant and retracting all the anteriors.

In some cases, any radical change from the pattern "laid out" by nature may prove unstable. This applies particularly to inherited Class II Division 1 cases, where parents or siblings show a family hereditary tendency toward deficient jaw development. The extraction of two upper second molars, as ad-

vocated by George R. Moore,[7] seems a most logical course of treatment. The extractions are to be followed by a rapid distal movement of the molars and premolars. The third molars will normally take their place alongside the first molars in quite a satisfactory manner.

In adult cases, removal of one or two premolars may greatly facilitate lining up of the anterior teeth, in order to obtain an improved esthetic effect.

Judicious extractions of deciduous molars have their indications.

Those cases that, due to the "advice" of ill-informed dentists, have postponed orthodontic treatment until the late teens, may require removal of some premolars in order to insure a stable result.

Satisfactory function of the dental apparatus and pleasing features are, of necessity, the simple and concise demands placed upon the orthodontist; and to obtain these, extractions may have to be resorted to as the need arises.

I should like to conclude with Brodie's[1] statement: "My hope is that the present wave of enthusiasm for the extraction of teeth will recede to the place where the method is employed only when dictated by well-controlled evidence."

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133-33 SANFORD AVENUE

VARIATIONS IN RESPONSE

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THIS paper is a discussion of some of those variations of response to forces acting in the mouth, which are the essence of our subject, the study of orthodontics. Hans Grüneberg,[1] writing in 1937 about the teeth of the gray-lethal mouse, described how in this mouse there was an absolute lack of response by way of bone absorption to the stimulus provided by the growing tooth germ. In the gray-lethal mouse "no tooth ever erupts."

He summarized his conception of the necessary conditions for response as follows:

"The old scheme was:

STIMULUS (Pressure) → RESPONSE (Absorption)

Now we have to fit in a new link:

STIMULUS (Pressure) → HEREDITARY BASIS FOR RESPONSE → RESPONSE (Absorption)

This link is disturbed in the gray-lethal. No response therefore can take place." This conception has considerably influenced my way of looking at orthodontic problems and I have tried to use it to explain the variations of response to forces acting in the mouth. For general purposes I have modified the formula to:

STIMULUS → BASIS FOR RESPONSE → RESPONSE

for it seems to me that other than hereditary factors can be included in the basis for response, or at least that an hereditary basis for response can be considerably modified by other factors. Case 1 is an example (Figs. 1, 2, and 3). This boy, now aged 10, lived near Rotterdam during the German occupation. The daily or almost daily ration was, I have been told, one-half pint of sugar beet soup, occasionally augmented by a piece of so-called "cake." Several times the boy fell down due to starvation. The effects on the teeth were that the incisors were unable to stand the stresses of occlusion and very rapidly became protruded and loose, a process which under normal conditions might have taken many years. His aunt had a very similar collapse of the teeth, which became extremely loose. His mother had the same condition but not to the same extent. His younger sister lost her temporary incisors at 4 years of age. There was an accelerated response to a normal stimulus through a

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Fig. 1.—Case 1.

Fig. 2.

Fig. 3.

Figs. 2 and 3.—Case 1.

change in the basis for response. It seems to me also that such a condition as rickets represents a change in the basis for response.

Are there any other conditions which, while not perhaps absolute, can be taken as analogous to that of the gray-lethal mouse? I would say that in the condition of cleido-cranial dysostosis we have to look for some abnormality in the hereditary basis for response to account for the delayed eruption of the teeth. What that abnormality is we do not know, but it is to my mind useful in thinking of orthodontic problems to try to see clearly in what direction we have to look for a solution. Lewin Payne,[2] Rushton,[3] and many others have recorded cases of this condition. Speaking from the dental point of view only, the chief findings were: delayed eruption of teeth even when there was room for eruption, and, very frequently the presence of supernumerary teeth. If we look at these findings from the point of view of this formula, we shall see that the lack of response (in this case lack of eruption) may be due either to the stimulus (in this case mechanical prevention of eruption by the presence of supernumeraries) or, as I have said, to an abnormal basis for response of hereditary origin. The fact that in many cases there are no mechanical obstructions in the form of supernumerary teeth indicates that the chief error lies in the basis for response.

To me the value of this formula is that it is broad enough to include any problems we may have connected with growth and development. It enables us to think of our problems in larger terms without the necessity of going into details. There is, however, one aspect of the basis for response that must be mentioned, namely, that it is constantly changing with age. Age is connected with the completion of processes each of which has a definite time in which it can be completed. That living processes are not a constant nature but vary with age is obvious to all.

Now we come to that puzzling condition of the submerged or partly submerged temporary molar. We know how certain temporary molars fail to rise with the line of occlusion, how once having stopped they appear to be forced downward into the gum by pressure from adjoining teeth. We know that they can become completely submerged under the gum but that this is not the usual process for, as a rule, they are lost more or less at the usual term.[4, 5, 6] My view of the mechanism is that owing to an error, perhaps a slight error of timing on the part of the body, the reason for which is still not clear, instead of continuous absorption taking place, there is a time, perhaps a short time, when an interruption or holding up, probably with ankylosis, takes place. This brings the tooth slightly below the line of occlusion. Later, mechanical forces hold and push the tooth down, but at any stage up to the normal term a new wave of absorption can take place, obliterating the ankylosis and freeing the tooth so that it is shed in the normal manner. If the tooth is retained much beyond the usual term, ankylosis is again likely to result, although probably some absorption will still be found. In the past, some observers have said that they consider the condition is not associated with ankylosis, while others have said that it is. Both views are

correct. It is simply a question of timing. Absorption is not a process which continues steadily and without pause. At any time there can be a pause. Deposition can then take place.

G. B. Pritchard[7, 8] speaking of absorption in his studies of ankylosed teeth, mainly unerupted teeth with some degree of infection present, says, "The invasion may start either on the enamel surface or the cementum, and passing deeply in may again attack these tissues from their dentinal surfaces. Active calcification of the invading tissues occurs in certain areas, while absorption is still in progress in others and the newly formed tissue is bone. This appears to be in continuity with the bone of the tooth socket and thus produces a transitory ankylosis. This ankylosis is transitory, and is merely a phase in the process of a complete absorption of the tooth and its replacement by bone.

"It would appear that this replacement is seldom completed." Here, then, we see two processes at work; absorption and deposition. They are complementary to each other.

Figs. 4, 5, 6, 7, 8, and 9 show two cases of partly submerged temporary molars, illustrating how, histologically, you sometimes find ankylosis and sometimes you do not. As I said, we still do not know what is the cause of the failure in timing of the process of eruption of these teeth, though we suspect, as Capon[5] showed in one of his cases, that abnormal tongue position may have something to do with it.

For a short while, I want you to consider our present knowledge of growth and movement in the jaws. From the past we today have inherited a great deal of knowledge as to the form and size of the teeth, the form and relations of the arches, and so on. Looked at from a static point of view, the subject is more or less completely worked out, but orthodontics takes into account movement, and herein lies its interest. Of our knowledge of movement a great deal has been contributed by members of this Society, using various techniques, such as serial models. Most of this we have absorbed. Now, by the use of cephalometric roentgenography, a technique first used by Broadbent,[9] a great deal of scientific information is coming to us from the United States. Gradually, piece by piece, the growth of each part of the head and jaws is being worked out. Much of this material confirms what was assumed before but much of it is new.

What marvelous processes are revealed when the living process of growth is studied, where change is the only constant. Examples abound of quickenings, of retardations, of changes of form, of changes of position, of changes of function, of one force being replaced by another, of variations of response, each case responding according to the way of its kind but in its own special way as well.

To illustrate timing, Fig. 10 shows a diagram contained in an essay by H. Carlson,[10] which won the annual prize award offered by the American Association of Orthodontists. Here we see how each tooth goes through the same process in its path to eruption; a gradual rise at the start, a rapid rise during

Fig. 4.

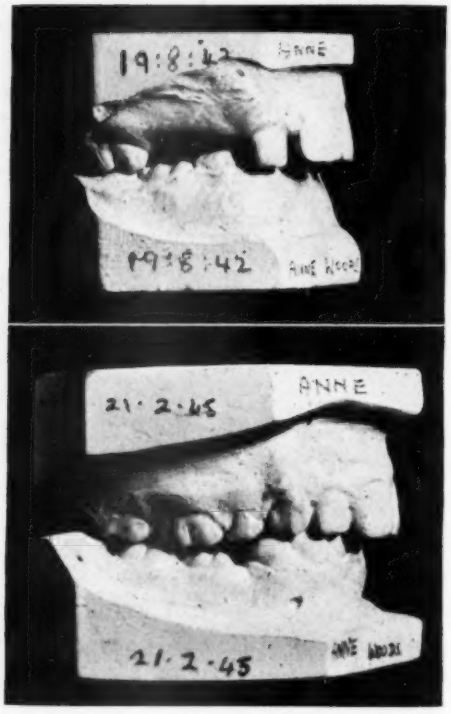


Fig. 5.

Fig. 4.—Case 2. First model, aged 8 years, 8 months.
Fig. 5.—Case 2. Model at time of extraction, aged 10 years, 2 months.

Fig. 6.—Case 2. Photomicrograph showing absorption only. (× 160.)

Fig. 7.

Fig. 8.

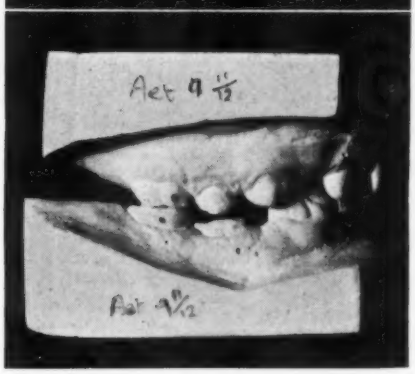


Fig. 7.—Case 3. First model, aged 7½ years.
Fig. 8.—Case 3. Model at time of extraction, aged 9 years, 11 months.

Fig. 9.—Case 3. Photomicrograph showing absorption and ankylosis with tearing of bone at a distance from the site of deposition. (× 160.)

one to two years before reaching the line of occlusion, a gradual rise again with the line of occlusion. You can see how small errors in the timing of this process can lead to various irregularities that we commonly see. Lewin Payne[2] remarked how teeth once delayed by mechanical forces were slow to complete their eruption, even after the obstruction had been removed. He was really describing teeth which had failed to take advantage of their optimum time for eruption.

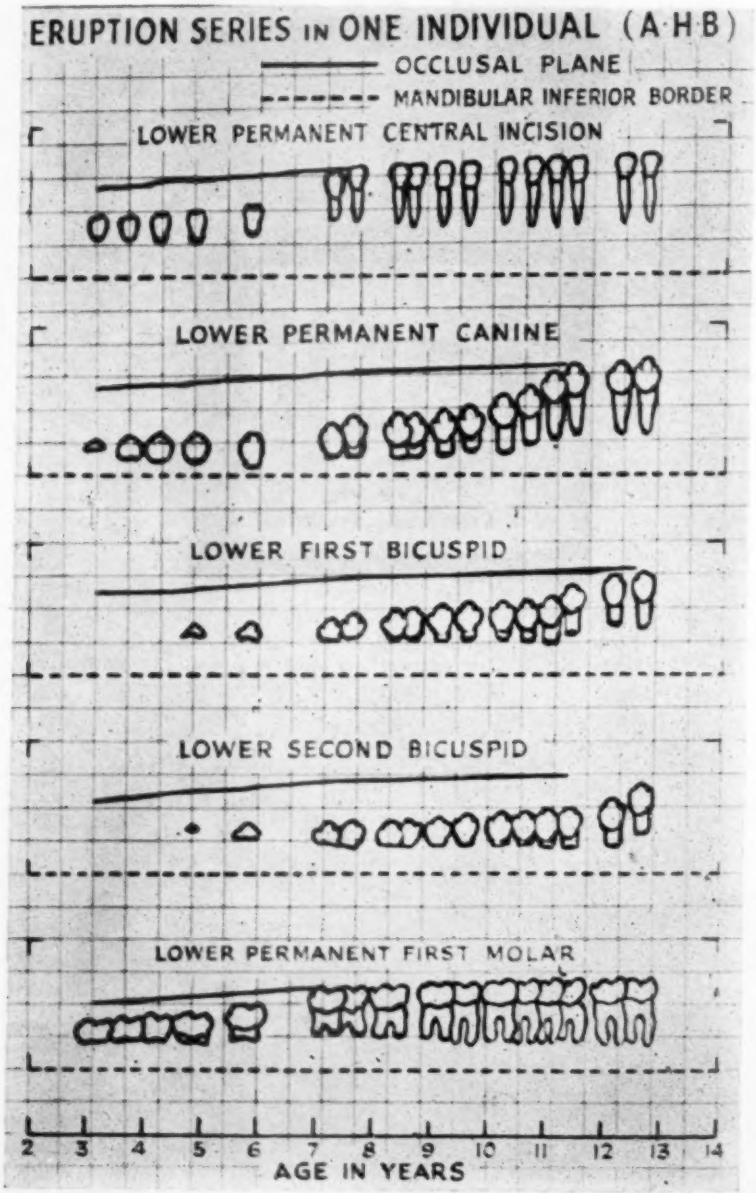

ERUPTION SERIES IN ONE INDIVIDUAL (A·H·B)
OCCLUSAL PLANE
MANDIBULAR INFERIOR BORDER
LOWER PERMANENT CENTRAL INCISION
LOWER PERMANENT CANINE
LOWER FIRST BICUSPID
LOWER SECOND BICUSPID
LOWER PERMANENT FIRST MOLAR
2 3 4 5 6 7 8 9 10 11 12 13 14
AGE IN YEARS

Fig. 10.

To illustrate the general aspect of timing and the almost new way of looking at our subject, I am going to read part of the preamble to a paper by Associate Professor Moses Diamond.[11] Diamond quotes Arey as follows: "The

growth of the body and its parts, organs, and functional systems is a pulsating process, which shows marked changes in rate from time to time. Many of these definite periods of alternate acceleration and slowing have been determined and commonly designated as "stretching" and "filling."

Diamond goes on to say, "The various components of this concise statement require amplification. One of these is the rate of growth. Growth rate is never of an even nature. It consists of alternate intervals of acceleration and retardation. These intervals of acceleration and retardation are different with each organ of the body." Later he says, "While these growth cycles of acceleration and retardation are independent for each part or organ of the body, there is an important interrelation between the growth cycles of adjacent parts."

To me it seems that in the next period orthodontic study will be very much concerned with the variations of timing in growth processes and with the relations between the growth processes in associated parts. Note again that these variations of timing are part of the "Basis for Response."

Up to now we have confined ourselves to the "Basis for Response." Now for a short while I want to speak of orthodontic treatment, which is concerned with producing response by the application of new forces. Clearly, if the basis for response were always the same, we should be able to produce always the same response to the same stimulus. That this is not so is obvious to us all. As Oppenheim[12] has said, "The reactions to the same force are different in different individuals." Risking the obvious, I would add that the reactions to the same force are different in the same individual at different ages. I can think of quite a number of cases where the correct force has been applied for quite a long period without result and then suddenly the case has resolved itself, often within a matter of weeks.

Cases 4, 5, and 6 (Figs. 11 to 22) illustrate the difference of response to intermaxillary traction to bring forward the lower arch.

Each case was treated by upper expansion followed by intermaxillary traction. Of course, the forces used were not exactly the same but these cases may be of interest. They were all cases under the care of Mr. Bocquet Bull at Guy's; treatment was mainly carried out by house surgeons under my supervision.

Movement seems to have been mainly in the upper arch, although the mandible has probably come forward a little. This case went fairly smoothly, although there were a few breakages in the early stages. Intermaxillary traction was used for three years. Since the completion of treatment there has been a slight relapse. The patient can still bite back a half unit.

The patient shown in Figs. 19 to 22 was the younger sister of Case 4. For several years, she broke everything we tried, but in the end she suddenly seemed to get better. Movement seems to have been confined to the upper arch with no forward movement of the mandible. Intermaxillary traction was used for three years. I do not believe there has been relapse in this case because I do not think the mandible was ever stable in the forward position.

This case went surprisingly well, when everything seemed against a good result. The patient was twelve years of age at the commencement and had already lost the lower first permanent molars. The response to intermaxillary

Fig. 11.

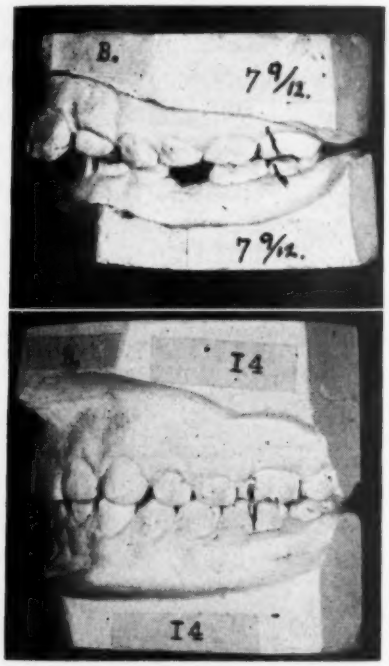


Fig. 12.

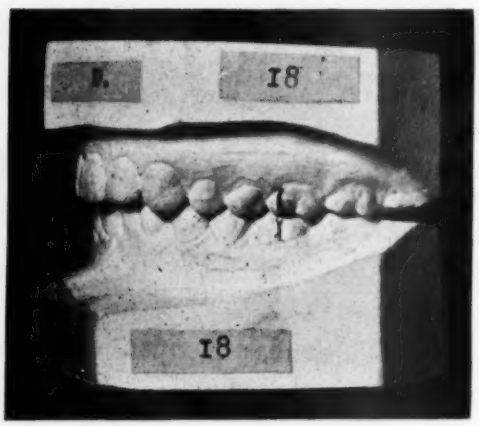


Fig. 13.

Fig. 14.

Fig. 11.—Case 4. Before treatment, aged 7 years, 9 months.
Fig. 12.—Case 4. After treatment.
Fig. 13.—Case 4. Two years after retention finished. Note slight relapse.
Fig. 14.—Case 4. Photographs before treatment and two years after retention finished.

traction was immediate, the mandible definitely coming forward. After the mandible had been forward for some time, we were uncertain of the stability of the upper arch. The upper second premolars were removed and the remaining teeth

aligned. Intermaxillary traction was used for one year but had done its work in six months. I think that since retention has ceased there has been a slight relapse.

Fig. 15.

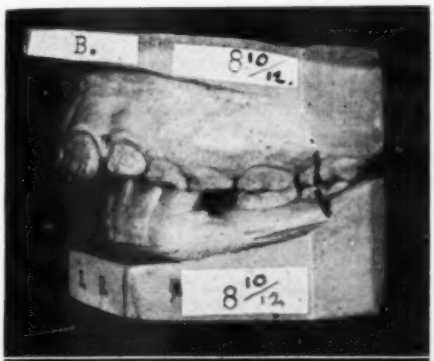


Fig. 16.

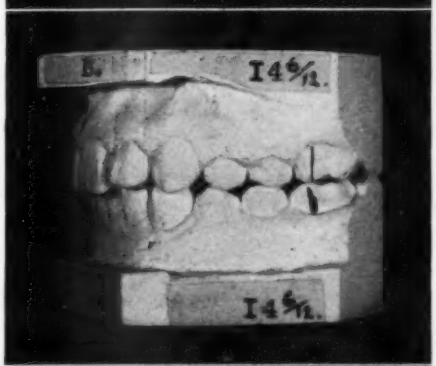
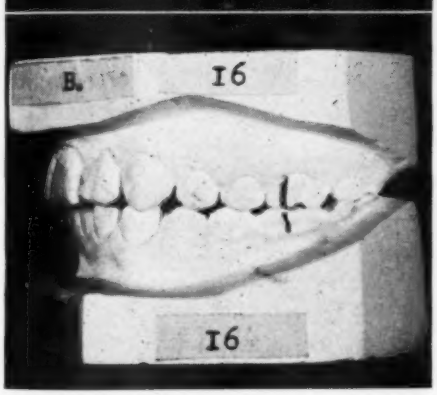


Fig. 17.



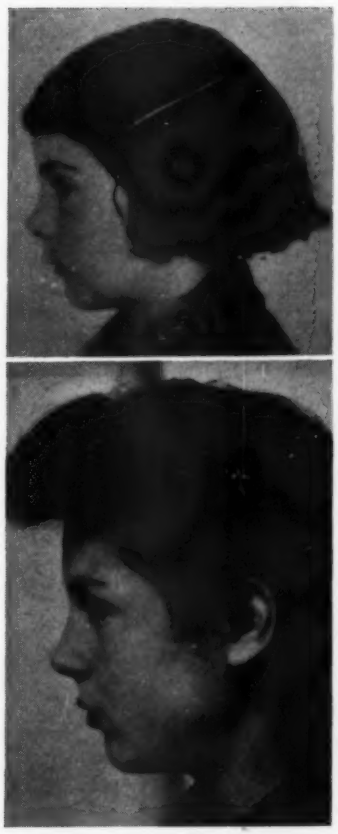


Fig. 18.

Fig. 15.—Case 5. Before treatment.
Fig. 16.—Case 5. After treatment.
Fig. 17.—Case 5. One and one-half years after the end of retention.
Fig. 18.—Case 5. Photographs before treatment and one and one-half years after the end of retention.

Mr. Chapman,[13, 14] in his papers in 1937, gave very high marks to intermaxillary traction for the treatment of Class 2, Division 1 in cases where growth of the arches was normal. This is perhaps correct. This method is highly efficient in the sense that it nearly always does something, but I think these cases show that you cannot take perfect results for granted. If you

take cases that are suitable, some go beautifully, miraculously almost. A few show no apparent change for the better. The majority benefit considerably from the point of view of appearance and perhaps health, enough to satisfy the parent but not enough to satisfy the operator. This refers to suitable cases.

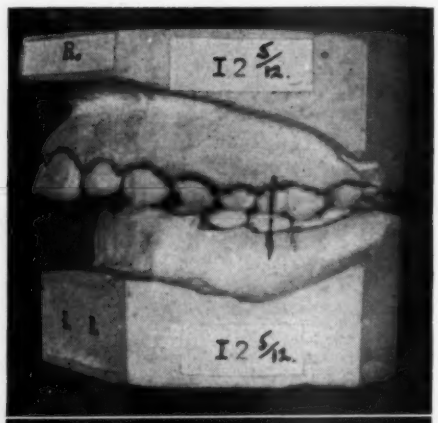


Fig. 19.

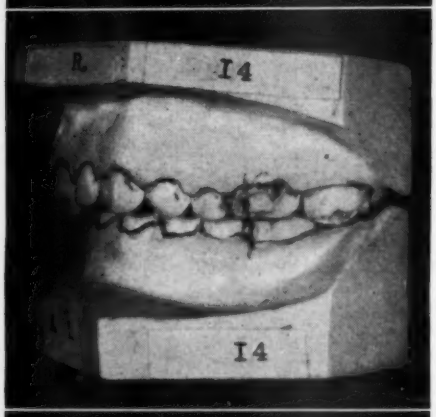


Fig. 20.

Fig. 21.

Fig. 22.

Fig. 19.—Case 6. Before treatment.
Fig. 20.—Case 6. Toward the end of treatment.
Fig. 21.—Case 6. About five years after the end of retention.
Fig. 22.—Case 6. Photographs before treatment, toward the end of treatment, and about five years after the end of retention.

The majority of postnormal cases, more so of course in hospital than in private practice, are unsuitable, and it is well to remember that a perfect result is unlikely where there is:

1. Lack of growth, loss of space and movements of the teeth due to early extractions.
2. Inability on the patient's part to understand what it means to bite forward.
3. A considerable lack of occlusion, when the mandible is placed forward.
4. Lack of interest, lack of cleanliness, and so on.
5. A family or personal history of bad luck, illness, and accidents.
6. Boarding school and evacuation.

Fig. 23. Fig. 24.

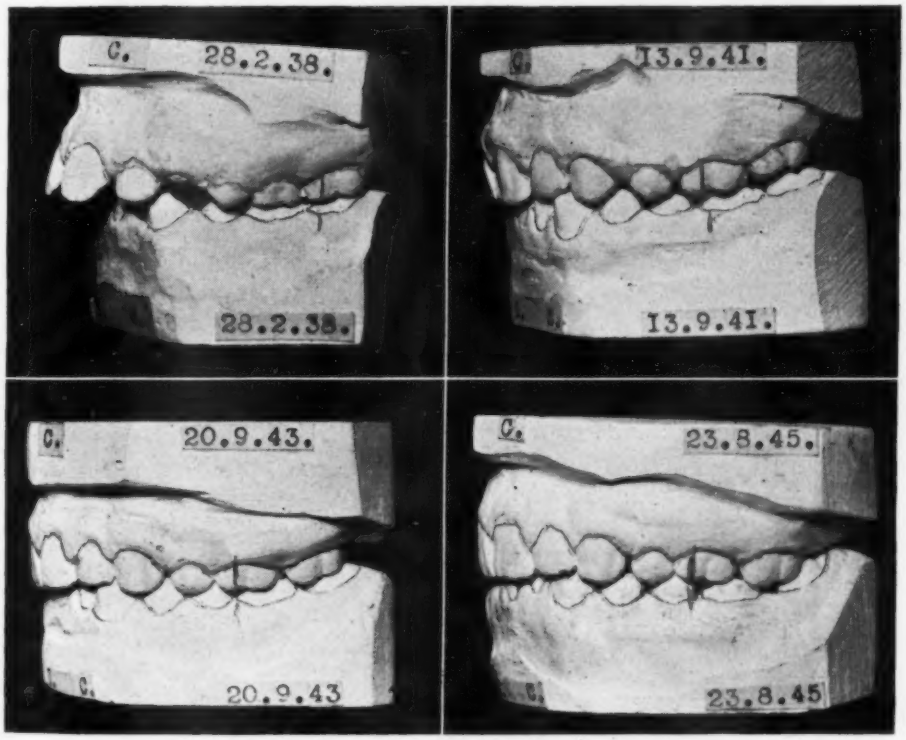


Fig. 25. Fig. 26.

Fig. 23.—Case 7. Before treatment, aged 9½ years.
Fig. 24.—Case 7. After treatment, aged 13 years.
Fig. 25.—Case 7. Two years after the end of retention, aged 15 years.
Fig. 26.—Case 7. Four years after the end of retention; two years after extraction of the lower second molars, aged 17 years.

Let us return to the cases that are suitable. They respond differently in the hands of the same operator. The answer must lie in the basis for response. How different this can be even with the same patient at different times. You can sometimes persevere for a long time with little effect and then suddenly you will find the case has resolved. In another case there will be an almost

immediate response and then you will after all find it very difficult, if not impossible, to get the mandible forward the last half unit.

Just now we spoke of relapse. From the point of view from which we are speaking, relapse following treatment with appliances is simply response to the forces remaining after the removal of appliances. It varies both with the stim-

Fig. 27. Fig. 28.

Fig. 29. Fig. 30.

Fig. 27.—Case 7. Upper and lower arch before treatment, aged 9½ years.
Fig. 28.—Case 7. Upper and lower arch after treatment, aged 13 years.
Fig. 29.—Case 7. Upper and lower arch two years after end of retention; relapse of lower incisors, aged 15 years.
Fig. 30.—Case 7. Upper and lower arch four years after end of retention; two years after extraction of the lower second molars, aged 17 years.

ulus and with the basis for response. If, during treatment, we in some way alter the forces operating, we must expect the new alignment we have made to react to the new set of forces we have called into play. We change the forces when we push a tooth over the bite, sometimes we change the forces when we succeed in altering the joint with intermaxillary traction, and we change the

forces for better or for worse, when we extract teeth. For orthodontic treatment to be successful, a change of forces must be achieved in some way or another.

Case 7 (Figs. 23-30) is a case where the lower arch was slightly postnormal. Treatment was by an upper bite plate, extraction of the upper first premolars, retraction of the upper canines, and forward movement of the lower incisors, retraction of the upper incisors, retention, and lastly extraction of the lower second molars.

Fig. 31.

Fig. 32.

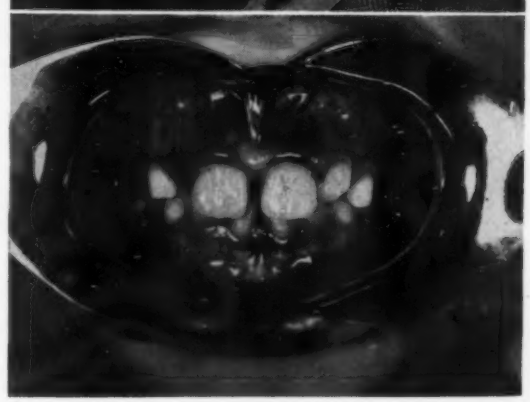


Fig. 31.—Case 8. Lateral photograph.

Fig. 32.—Case 8. Photograph of teeth $\frac{ED \mid D}{D \mid E}$ extracted at 6 years, 2 months.

This case illustrates how extraction of upper premolars can produce a permanent change of forces and how a correct relation of incisors and canines tends to remain stable. It also shows how simple forward movement of lower incisors is liable to relapse as no forces have been changed. I have often won-

dered whether, if I had removed the lower second molars before retention ceased, the lower incisors would have remained in their correct position.

This is all I want to say here about response to treatment. I have shown that this varies not only with the stimulus but with the basis for response.

Cases 8 and 9 show exceptions to certain rules, which generally apply, when temporary teeth are extracted early.

In 1937[15] I found that of the children attending as orthodontic patients at Guy's Hospital, over 80 per cent who had had upper and lower temporary molar extractions had a deep incisor overlap. Case 8 (Figs. 31 and 32) is a typical example.

Fig. 34.

Fig. 33.

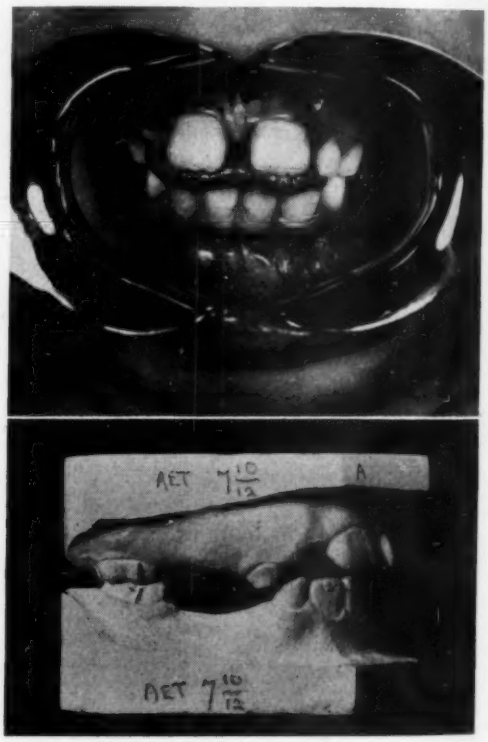


Fig. 35.

Fig. 33.—Case 9. This case shows open-bite in spite of early extractions, the patient being a thumb sucker. Aged 7 years, 10 months.

Fig. 34 and 35.—Same patient as shown in Fig. 33. Not only does he suck his thumb (nowadays secretly) but his tongue is also to be found between his incisors. The case also shows no loss of lower spaces. If you look carefully you will see that the tongue also protrudes into the spaces left by the extractions.

I often asked myself, "Why don't all cases of this kind have a deep incisor overlap?" I was struck at the time by the number of partial open-bite cases in which there seemed to be no closure of the bite at all following early extractions. Gradually since that time, I have come to see that many of the exceptions to the general rules as to the movements following early extractions are due to local prevention of those movements. Case 9 (Figs. 33 to 35) is an example.

Case 10 also illustrates the same point. Temporary molars were removed at 7 years, 5 months of age, but the lower spaces were not lost as the tongue filled the spaces (Figs. 36 and 37).

I have seen that some people[16] maintain that the usual sequelae of temporary molar extractions do not follow where there is normal growth. Now,

Fig. 36.—Case 10. One temporary molar lost at 5 to 6 years of age. Remainder lost at 7 years, 5 months. Now aged 8 years, 9 months.

Fig. 37.—Case 10. Occlusal view of upper and lower arches.

normal growth is connected with the basis for response. Personally, I think the main reason lies elsewhere, that is, in the stimulus. It is tongue habits which control to a great extent the form of normal growth and the form of the lower arch, although, of course, normal cell activity is necessary as well. Mr. Rix's[17] address last month showed us what we have to investigate next. We

need a much more accurate knowledge of tongue habits during deglutition and speech.

I have brought forward material for discussion and at the same time have tried to indicate where we must look for the answers to some of our orthodontic problems, I have also tried to show that profitable future research lies in the further study of local pressures on the teeth and in the further study of the timing of the different processes that make up that highly complicated process, the growth of the jaws.

I would like to thank Mr. Bocquet Bull and Mr. R. E. Rix for allowing me free use of their cases, Mr. G. B. Pritchard for his expert advice on the sections of submerged temporary molars, and the Dental Council of Guy's Hospital Dental School for allowing me the facilities of the Research Laboratory. My illustrations were prepared by Mr. J. F. Dudley of the Dental Research Laboratory and Miss Treadgold of the Photographic Studio. To them both I wish to express my very great appreciation. Lastly, I wish to thank Mrs. Lindsay for her invaluable assistance. London Photocraft Ltd. very kindly gave facilities for making photostatic copies of the paper.

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Erratum

In the article by Ashley E. Howes, "Case Analysis and Treatment Planning Based Upon the Relationship of the Tooth Material to Its Supporting Bone," in the August issue of the Journal, pages 499-533, the following corrections should be made:

The legend for Fig. 12 should read "Group I case with normal apical base."

In Fig. 26 the x-rays should be labeled "Before treatment" instead of "Left" and "After treatment" instead of "Right."

The legend for Fig. 32 should read "Apical base lines of case shown in Fig. 30. Original ----------; after treatment . . . . . ; after relapse ----------.

Editorial

The Separation of the Journals of Orthodontics and Oral Surgery

IF YOU have read historical data pertaining to the development of orthodontics as a specialty of dentistry, you have been impressed with the fact that Orthodontics evolved from the department of mechanical dentistry and for years remained in a more or less nebulous state.

It is true, however, that the names of a few outstanding individuals who made important contributions to the subject previous to the beginning of the century have survived. They contributed much of the groundwork for the years that followed. Among these were Angle, Case, Jackson, Kingsley, Guilford, Baker, and still others, all authors of textbooks and manuscripts.

Then, early in the century, the Angle School of Orthodontia appeared in St. Louis, Missouri, and from this group came forth a nucleus of orthodontic enthusiasts who were fired by the inspirational teaching zeal of Angle and his associates. From this beginning the nebulous mass of orthodontic information began to crystallize and take shape, and it soon became obvious that orthodontics was destined to take its place as the first and original ranking specialty in dentistry. This group quickly banded together with an almost uncanny urge to advance their cause. To name only a few who left an important imprint on the new specialty at about this time were Ketcham, Young, Pullen, Summa, Hawley, Dewey, Stanton, Lourie, Hellman, and many others too numerous to mention, some of whom are still carrying on. This group of men were enthusiastic about their work and would cross the continent at the drop of a hat in order to keep up with the trends of thought in the advance of orthodontics. They attempted to launch a scientific journal called the *American Orthodontist;* however, this proved to be rather short-lived and soon folded up like the traditional Arab's tent.

This suggests that there are a number of things about the background of the specialty which are interesting but little known. You may or may not be aware of the fact that the greatest inspiration for the launching of the INTERNATIONAL JOURNAL OF ORTHODONTIA thirty-two years ago to record orthodontic manuscript (during World War I) came from none other than the late Dr. Will Mayo of the Mayo Clinic in Rochester, Minnesota. In an informal talk with Dr. C. V. Mosby, the pioneer publisher, Dr. Mayo happened to make the casual comment that "this new specialty of dentistry, orthodontia, had more possibilities for important contributions to childhood, particularly in health-saving and esthetic ways, than any other department of either medicine or dentistry."

Dr. Mosby obviously believed this to be true because he immediately interviewed a number of orthodontists in various parts of the country. He lunched with them, he talked to them, and he developed an enthusiasm and urge for

the subject that he never lost. He knew Dr. Angle personally in the formative period of Dr. Angle's career, and he watched the birth of the specialty in the city of St. Louis as a young man, while selling scientific books to physicians and dentists.

Dr. Edward H. Angle was solicited to become the first editor of the JOURNAL. However, either because of lack of interest or doubt as to the ultimate success of the enterprise, he was plainly indifferent. Dr. Martin Dewey was then asked to take over the editorship, at a time when it was a constant and never-ending struggle to secure sufficient manuscript for each issue in order to go to press. For some of the early issues, Dewey wrote much of the text himself. Dewey was blessed with a marvelous memory and a mind like a steel trap. If worst came to the worst he could sit down and in one hour dictate enough material to fill half an issue of the JOURNAL. "On what subject?" you may ask. The answer is, "On any subject even slightly allied to orthodontics."

This history, that is now becoming more interesting, suggests still other thoughts. Even though orthodontics is young, its record has obviously made a favorable impression on public consciousness, along with psychiatry, ophthalmology, gynecology, obstetrics, and others. Orthodontics for instance, is our only specialty listed in a current magazine article discussing specialties of medicine and the only specialty mentioned that stems from the dental profession. All of this happened because of the pioneer work of nearly fifty years ago.

For some time, it has seemed to the editors of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY that now, after thirty-two years of publication of the richest and most comprehensive scientific literature in any department of dentistry, orthodontics and the JOURNAL are amply able to stand on their own feet and their own record. There are now sufficient trained workers in the field to assure the specialty a much more rapid advance than could be anticipated at the time that Dr. Will Mayo and Dr. Mosby (neither one orthodontists) received their inspiration. This was Dr. Mosby's original plan. However, due to the practical realities of the publication business, it has been necessary to combine with Oral Surgery in most of the years now past, a fact which many critics have failed to realize.

With the thought in mind of establishing the Orthodontic Journal alone, a recent poll of orthodontists was made, and it was ascertained that they are greatly in favor of supporting a journal devoted exclusively to the subject of orthodontics. The ratio in favor of this was five to one. Three to one were in favor of including more children's dentistry with orthodontics. The number of questionnaires returned reflected an interest that is nothing short of amazing. It revealed, too, that the members of the specialty are much concerned with the printed record of its future.

It has been definitely decided that in January, 1948, the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY will be separated into two journals, one to be known as the *American Journal of Orthodontics* and the other *The Journal of Oral Surgery, Oral Medicine, and Oral Pathology*. It is thought thereby that each journal will serve its specialty better.

The orthodontic journal will still reach the members of the American Association of Orthodontists by en bloc subscription just as it has in the past. In

addition, each individual subscriber should advise the publishers, The C. V. Mosby Company, which journal he wishes to receive after Jan. 1, 1948. In many instances undoubtedly the subscriber will be interested in receiving both journals.

This move has not been made without careful thought and without first having taken a poll of the subscribers of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY, and it is believed that it is in accord with their wishes.

H. C. P.

Orthodontics for All

WHY do not dental educational institutions include more orthodontics in their teaching curriculum? This question seems traditional and is asked periodically. However, it is plainly never answered to the entire satisfaction of those who ask, regardless of how many times the query is made.

"Orthodontics for All" is the heading of an article that appears in *Oral Hygiene* for August, 1947, and again raises the same theme. It points out that orthodontics is a part of dental practice; that it should be more thoroughly taught to the dental student, and begs the question, "Why is orthodontics not included in general practice more than it is at present"?

If dental educators should answer that question as to why the subject is not taught to the undergraduate in a more thorough manner, and if they were required to answer in a few words, they would probably say, "There is insufficient time allotted the present dental curriculum to teach the subject properly; therefore, we do the best we can as a compromise."

If you should ask any dentist the question as to why orthodontics is not and cannot be included in general practice, he would probably say that it can be if the dentist is properly trained and is competent to practice that particular department of dentistry.

This subject is anything but new, for no less an authority than the late Edward H. Angle was one of the very first to discover the difficulties of orthodontic teaching. He taught undergraduate courses in orthodontics at St. Louis University and at Northwestern University back in the 1890's. It is said that he soon discontinued this activity because these institutions were both unwilling and unable to allot sufficient time to teach the course other than as a mere gesture, and he was adamant and firm in his position that the course must be taught either thoroughly or not at all.

Dr. Angle then gave up university teaching and established the Angle School of Orthodontia, as a private postgraduate course. That was the beginning of the original nucleus of orthodontic specialization and was the source of training of most all of the pioneer orthodontists of the world, that is, those who specialized.

This situation has changed but little since the 1890's in that dental educational institutions (if we are to judge by the report of the Council on Dental Education of the American Dental Association) are still unable to allocate suf-

ficient time to teach the subject satisfactorily to the undergraduate student.

Those who are widely experienced in orthodontic teaching know that, unlike most departments of dental practice, orthodontics requires not only thorough basic training and indoctrination of the student, but of even greater importance, it requires extensive clinical training under the tutorage of a watchful and experienced eye, before the student can be regarded as other than an amateur in treatment dexterity. They know that all of the basic training that the student may have, notwithstanding, most of his skill in treatment is developed in the crucible of clinical experience—the hard way for both the patient and the student, but the only secure way to get the pulse and skill in treatment.

Dental schools are physically unable to supply this tedious clinical training to undergraduates any more than medical schools are able to supply internships and careful clinical training to their undergraduates. Orthodontic training has been tried many, many times in both educational institutions and privately, but without clinical experience, it has been proved pretty much of a gesture and little more.

Orthodontics seems to be on the way to becoming essentially a graduate course in most dental schools and no doubt that is the most practical solution to the problem, because it supplies the time necessary for the job.

Orthodontic education requires more of the element of time than does any other department of dental education and the student can no more become expert in treatment without the consumption of hundreds of hours of time than he can learn to play the piano without the same price having been paid.

He who is able to solve the undergraduate orthodontic education problem satisfactorily and at the same time by-pass the hundreds of hours of clinical time necessary to accomplish this purpose—such a miracle man has yet not appeared on the orthodontic scene. Why are the so-called orthodontic refresher courses now so popular in such great demand? You would probably answer that by saying that the average orthodontist realizes his limitations in training more than does anyone else after he has been in practice for a time.

H. C. P.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

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What Is "Normal"? Editorial: J. A. M. A. **133**: 1011, April 5, 1947.

What is the meaning of the term "normal" as applied to the human body? The results of physical examinations and laboratory tests are often recorded with the word "normal" jotted down with an easy assumption of accuracy entirely unjustified by the facts. In a discussion of this subject Ryle* says that "normal" is commonly considered as synonymous with "healthy"; but that label too needs better definition.

Probably most physicians simply mean by "normal" that an obviously demonstrable pathologic lesion has not been found. Yet, as Ryle points out, even this is questionable. Palpable epitrochlear glands, for example, which may be as large as a cherry stone, are demonstrable in about 40 per cent of adult men, unrelated to the presence of syphilis or other generalized disease of the lymph nodes. To say that the presence of palpable epitrochlear glands, therefore, is or is not normal raises an interesting question. A similar variability, Ryle says, obtains in respect to practically all measurable features of anantomy and physiologic activity. Organs and structures have a range of variation in size, shape, or position. Variation in the human body is inherent in the race.

Where bodily function is concerned, a sharp demarcation between inborn variations of health and induced variations of disease is not possible. Furthermore, a structure or function showing an extreme degree of variation from the mean may contribute to certain predispositions to disease or injury. A complete standardization of structure and function would be incompatible with life. Variability of one individual from another and variability influenced by age, sex, and activity in the population or species are essential to survival.

The chief difficulties in clinical medicine are encountered at the extreme ranges of natural variation. When does the pulse rate cease to be "normal"? At what point do the heart sounds, the strength of the knee jerk, the size and characteristics of the tonsils or the state of the thyroid pass from "normality" to the stage of disease? These are fundamental questions complicated in practice by the fact that the clinician is preoccupied with the sick and lacks access to and possibly interest in healthy controls. This largely one-sided view should not be overlooked by the practicing physician if his concept of normality is to imply, as it should, merely that the structure or function examined lay within a "range" not apparently reflecting any disease process.

Some variation, as Ryle says, can be measured and more accurate definitions given of the "healthy range." The pulse rate, the body temperature, the hemoglobin, and the basal metabolic rate are examples belonging to this

*Ryle, John A.: The Meaning of Normal, Lancet 1: 1, 1947.

group. For each of these, however, constant re-evaluation is necessary. There is no sharp dividing line between health and disease. The dictionary definition of "normal" does not, therefore, mean the same as the term does when employed by physicians in reference to the human body.

"The Story" of Dentistry: By M. D. K. Bremner, Ed. 2. Dental Items of Interest, Brooklyn, N. Y., 1946.

In the preface we are informed, "all this has been told before by different men. *The Story of Dentistry* is not a source book, but rather a compilation of material from many writers in the literature of dentistry and allied fields." To this and the reasons mentioned for its compilation one can find no objection, for it presents in an interesting and readable manner the development of certain ideas in the evolution of dentistry. Whether it is "a fairly accurate account of dentistry's evolution" the reviewer will not pass upon, nor will he attempt to clear up historical facts already in print. If it were prepared for "the student in particular" as the author states, then it is necessary to call its shortcomings to these students' attention.

By again including the "Introduction to the First Edition" it also leaves the impression that it is a history of dentistry. If it is so intended, the reader is cautioned to check for himself each statement before using it as historical material.

Being a second edition, it would seem that between 1939 and 1946 the author had more than sufficient time to recheck facts, correct dates, misspelling of names, and to prepare a proper bibliography and an accurate index. Then it might have been used as a "source book" as well. Unfortunately, such is not the case.

"One well-known writer suggested" or "an authority states" minus the name or article renders the statement useless, and only occasionally can one find the source mentioned of any of the author's statements. Had the author supplied this at the end of each chapter, that at least would have been of great help to the reader.

The general bibliography at the end needs complete revision, for it lacks such information as the date and place of publication of books, the pages and volume number of periodicals, also the full title of the work or article cited.

Many of the references as given are incorrect and too short, such as my "Fundamental Changes, etc." on page 321. It should read "Fundamental Changes in Dental Practice From Its Concept in 3000 B.C.," which happened to have been published in the *Dental Items of Interest,* 1943, and not in the *Journal of the American Dental Association,* as cited. Such errors make it impossible for others to find what they desire.

One wonders why the author has not included in the bibliography all of the articles or books that he used and why, when using such material, it is not given accurately. On page 83 we read: "We know, for example that Gardette who arrived during the Revolutionary War wrote to a friend in France that he should bring a copy of Fauchard's book, etc." As far as I know this statement appeared in my book: "Pierre Fauchard, Surgeon Dentist," and on page 11, thereof, I included the letter James Gardette wrote to his brother, Spiritou, an engraver in France, and not to a friend as in the text; therefore, this book as well as many others should have appeared in the bibliography.

Just how inconsistent the author is can best be judged by the following example on page 83: "We have seen the opinion expressed by Chapin A. Harris, a famous French dentist writing in 1821, etc." Compare this with the biographical sketch of Chapin A. Harris, opposite page 65, and we read that

Harris was born in Pompey, Onandaga County, New York, May 6, 1806." How then could he have been a famous French dentist writing this work and what work was it, at the age of 15?

Writing of Fauchard on page 84, we find: "We do know that he was born in Brittany in 1678 and died in 1761," yet on the following page (third and fourth lines from the bottom) there is the following: "Fauchard died in 1758 at the ripe old age of about eighty-three." If it is important to include such information it is more important to have it correct and not have the reader try to guess that the year of death was 1761.

Another example of confusion is to be found on page 109 when the author writes: "He (Parmly) was President of the Society of Dental Surgeons of the City and State of New York organized in 1834." (In the index the page is incorrectly given as 108.) Now on page 110 the same society is referred to as the New York Society of Dental Surgeons, a society that never existed. A similar example is to be found in speaking of the first national dental society on page 109. In the second paragraph we find the correct name, The American Society of Dental Surgeons, yet in the very next one it states that Brown served as "recording secretary of the American Association of Dental Surgeons."

As for the incorrect spelling and use of proper names, the following will be suffiicent to show that the first edition was never checked for errors. On page 108 we find the name of Samuel Sheldon Fitch, while the same individual on page 280 becomes Solomon Sheldon Fitch. As for Joseph Fox, the English writer, he never had a middle name or initial; he now becomes, on page 279, J. N. Fox (1803), while in the index, page 326, Joseph W. Fox.

While one dislikes to see Dinely for Dinly, Le Meyur for Le Mayeur, and Lafoulon for Lefoulon, I am sure the famous oral surgeon, S. P. Hullihen (page 276), would not have recognized that Hullian (pages 275 and 327) was intended for his name. These are but a few examples picked at random, but they suffice to illustrate why the student cannot depend upon, nor is it advisable to use, such information.

The author shows that he has read much and spent considerable time and effort gathering the material, and it is a pity that careless, hasty preparation and inconsistencies render the *Story of Dentistry* impossible as a "source book."

This review is intended as a plea that others in the future pay greater attention to what some might consider minor details that are, however, of the utmost importance. We owe to our readers accuracy in spelling proper names, consistency of dates, names, and facts. To those whose writing we use, due credit should be given for their labors. A well-prepared bibliography will help others to find what they seek and an index will enable the reader easily to locate on the correct page the item desired. This is especially true of a second edition.

B. W. Weinberger.

News and Notes

Meeting of American Association of Orthodontists, April 27, 28, and 29, 1948

It is not too soon to be making plans to attend the next annual meeting of the American Association of Orthodontists to be held at the Neil House in Columbus, Ohio, April 27, 28, and 29, 1948.

As usual, the day preceding the scientific meeting will be devoted to registration, golf, and a stag party in the evening at the Columbus Country Club. This is the course, by the way, where the last two annual invitationals have been played, so bring your clubs and match scores with the professionals.

The scientific program for the meeting is about completed. It is well balanced, and should be attractive to the young practitioner, as well as those who have practiced for many years. A statement from the program chairman, Dr. George M. Anderson, is as follows:

"The scientific program for the meeting of the American Association of Orthodontists at Columbus, Ohio, April 27, 28, 29, 1948, is not an aimless get-together of subject matter, but a correlated program toward a coordinated effort revolving around a theme:

The Passage of a Patient Through an Orthodontist's Office

"There is no overemphasis on any particular phase of orthodontic practice. We have preferred to develop the program around fundamentals and to provide a broad base for consideration, from which the oldest and the newest member of the specialty may observe, compare, and, we believe, derive benefit. The first paper will consider 'The Consultative Period'; the last paper, 'Retention.' Between, covering a period of two and one-half days,

the subjects of diagnosis and therapy will receive full and detailed consideration. There will be a concluding afternoon period of clinics.

"The theme of our meeting conveys a promise of much useful material. We suggest, at this early date, that you mark your appointment book so as not to miss an unusual opportunity."

EARL G. JONES, PRESIDENT.

Reservations

Members of the American Dental Association are invited to attend this meeting. Proper credentials should be obtained in advance from the secretary of the American Association of Orthodontists, Dr. Max E. Ernst, 1250 Lowry Medical Arts Building, St. Paul 2, Minnesota, or from the secretary of a constituent society.

Those desiring to make reservations at the Neil House should address their correspondence to Mr. Paul Ringle, Resident Manager, Neil House, Columbus 16, Ohio.

Meeting of American Board of Orthodontics, April 23, 24, 25, and 26, 1948

The 1948 meeting of the American Board of Orthodontics will be held at the Deshler-Wallick Hotel, on State House Square, Columbus, Ohio, April 23, 24, 25, and 26, 1948.

Those desiring to make reservations at the Deshler-Wallick should address their correspondence to Miss Katherine Winebar, Reservation Manager, Deshler-Wallick Hotel, Columbus 16, Ohio. The Deshler is only one-half block from the Neil House.

LOCAL ARRANGEMENTS COMMITTEE,
F. R. ALDRICH.
ROBERT E. WADE.
D. C. MILLER.

Orthodontists who may desire to be certified by the Board may obtain application blanks from the Secretary, Dr. Bernard G. deVries, 705 Medical Arts Building, Minneapolis 2, Minn.

Great Lakes Society of Orthodontists

The eighteenth annual meeting of the Great Lakes Society of Orthodontists will be held Oct. 27 and 28, 1947, at the Royal York Hotel, Toronto, Canada.

The two-day meeting will feature the following essayists:

Dr. Wendell Wylie, San Francisco, California.

Dr. W. B. Downs, Chicago, Illinois.

Dr. Andrew Jackson, Philadelphia, Pennsylvania.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists (formerly New York Society of Orthodontists) will be held at the Waldorf-Astoria Hotel, New York, on Monday and Tuesday, Nov. 10 and 11, 1947.

Southwestern Society of Orthodontists

The next annual meeting of the Southwestern Society of Orthodontists will be held at the Broadview Hotel, Wichita, Kansas, Feb. 1, 2, 3, and 4, 1948.

Seminar for the Study and Practice of Dental Medicine

The fourth annual seminar for the study and practice of dental medicine will be held at the Ahwahnee Hotel in Josemite, California, on Oct. 19 to 24, 1947.

Rocky Mountain Society of Orthodontists

The Rocky Mountain Society of Orthodontists held its annual meeting on Oct. 15 and 16, 1947, at the Cosmopolitan Hotel in Denver, Colorado.

The program follows:

Wednesday, Oct. 15, 1947

"Intermittent Treatment Using Removable Appliances." (Paper and Clinic.) William R. Humphrey and George H. Siersma, Denver, Colorado.

"Indications and Contraindications for Extractions as Related to Facial Harmony." Roscoe L. Keedy, Grand Junction, Colorado.

"Indications for and Results of Extractions." Henry F. Hoffman, Denver, Colorado.

"Principles and Mechanics of Treatment With the Sliding Twin Section Appliance." Clarence W. Carey, Palo Alto, California.

Joint meeting with Denver Dental Association.

Symposium on Dental Caries Control.

"Gottlieb Theory of Dental Caries, Etiology and Control." Miles R. Markley, Denver, Colorado.

"Use of Ammonia Compounds in Dental Caries Control." Ernest T. Klein, Denver, Colorado.

"Dietary Control of Dental Caries." Robert A. Downs, Denver, Colorado. (Director, Division of Public Health Dentistry, Department of Public Health, Colorado.)

Report on "Workshop on Dental Caries," conducted at University of Michigan, Sept. 8 to 13, 1947. Henry C. Gage, Denver, Colorado. (Full-time dentist, Denver Public Schools.)

Thursday, Oct. 16, 1947

"Treatment of Extraction Cases With the Sliding Twin Section." (Lecture and Table Clinic.) Clarence W. Carey, Palo Alto, California.

"A Modified Positioner Technique for Retention." (Lecture and Table Clinic.) Clarence W. Carey, Palo Alto, California.

"Proper Time to Start Orthodontic Treatment." Oliver H. Devitt, Denver, Colorado.

Moving Picture (color). "Impression Technique Using Hydrocolloid Materials." Prepared by Howard Land and John Wilson, Los Angeles, California.

Dental Research Course Announced

The Army Medical Research and Development Board has entered into a contract with the University of Rochester School of Medicine and Dentistry, Rochester, New York, to conduct a planned program of dental research in which Army Dental Corps officers will participate.

The program embraces research and studies in connection with the bacteriologic and biochemical aspects of dental caries with special emphasis on the possible importance of proteolytic bacteria in the causation of caries. This investigation will be conducted in the Departments of Bacteriology and Dental Research, under the direction of Dr. George P. Berry, Professor of Bacteriology, and Dr. J. E. Gilda, Senior Fellow in Dentistry. The study will be carried on in close cooperation with Dr. Basil G. Bibby, Director of the Eastman Dental Dispensary.

Also included in the program is the assignment and enrollment in the University of one or more selected Dental Corps officers to participate in this and subsequent studies and to pursue advanced study in the biologic sciences as graduate students.

Captain George W. Burnett, D.C., of the Army Medical Research and Development Board, Surgeon General's Office, is the first officer to be assigned to the University to study under this dental research program.

It is contemplated that additional qualified Army Dental Corps personnel will be selected for training and participation in other fields of dental research having military application.

American Dental Association, Annual Meeting

The Eighty-Eighth Annual Meeting of the American Dental Association at Boston, Massachusetts, from Aug. 4 to 8, 1947, was one of the largest and most successful dental conventions ever held.

Featuring the first postwar scientific sessions of the American Dental Association and the Tenth International Dental Congress, which last met in Vienna in 1936; the meeting was attended by more than 10,000 persons, including delegates from forty-one nations. In addition, there were several thousand wives and children who accompanied dentists to New England for vacation trips before and after the convention sessions.

All scientific sessions and clinics, with the exception of a number of special demonstrations at Massachusetts General and Boston City hospitals, were held at Mechanics' Building, together with displays of commercial and health exhibits.

General sessions and meetings of the House of Delegates were in the Imperial Ballroom of the Statler Hotel.

Through special arrangements made by Dr. Harold Hillenbrand, General Secretary, each delegate, for the first time in the history of the Association, had his own desk on the floor of the House. Delegates were seated by trustee districts and portable microphones enabled each delegate to address the assembly without leaving his seat. A new type of secret ballot was used which permitted more speedy voting in the various election contests.

Dr. H. B. Washburn, of St. Paul, Minnesota, was formally installed at the new President of the Association, succeeding Dr. Sterling V. Mead, of Washington, D. C.

Dr. Clyde E. Minges, of Rocky Mount, North Carolina, was named President-Elect, winning over Dr. Fred J. Wolfe, Sr., of New Orleans, Louisiana.

Other American Dental Association officers elected were: Dr. Philip Adams, of Boston, local arrangements chairman for the convention, First Vice-President; Dr. Fred A. Richmond, of Kansas City, Kansas, Second Vice-President; Dr. A. M. Smith, of Tampa, Florida, Third Vice-President; and Dr. Roscoe H. Volland, of Iowa City, Iowa, Treasurer.

Dr. LeRoy M. Ennis, of Philadelphia, was unanimously re-elected trustee for the Third District (Pennsylvania). In four other trustee districts, contests developed.

For the Fourth District (Delaware, District of Columbia, Maryland, New Jersey, Puerto Rico, Army, Navy, Public Health Service, and Veterans Administration), Dr. Daniel F. Lynch, of Washington, D. C., was elected. The balloting was 181 for Dr. Lynch and 175 for Dr. George Anderson, of Baltimore.

For the Fifth District (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Virginia) Dr. James E. John, Sr., of Roanoke, Virginia, was elected, defeating Dr. Edward L. Thompson, of Daytona Beach, Florida, by a vote of 193 to 156. A third candidate for trustee of the Fifth District, Dr. Howard B. Higgins of Spartanburg, South Carolina, withdrew as the balloting started.

For the Eighth District (Illinois), Dr. Harold W. Oppice, of Chicago, was re-elected as trustee, defeating Dr. Frank J. Hurlstone, also of Chicago, 233 to 104.

For the Ninth District (Michigan and Wisconsin), Dr. O. H. Moen, of Watertown, Wisconsin, was elected, receiving 184 votes to 150 votes for Dr. E. C. Wetzel, of Milwaukee, Wisconsin.

Army Doctors and Dentists to Get Extra $100 a Month*

Major General Raymond W. Bliss, Surgeon General of the Army, announced recently that effective September 1 an additional $100 a month will be paid to all Regular Army Medical and Dental Corps officers as well as other officers serving voluntarily on extended active duty in these Corps.

General Bliss emphasized that this addition to the incomes of medical and dental officers is regarded by the War Department "not as a pay increase but as an equalization measure designed to bring the incomes of Medical and Dental Corps officers more nearly in line with those of civilian doctors and dentists."

General Bliss explained that "the additional compensation will also aid in reimbursing the medical and dental officers for the costs of their professional education and for their loss of earnings while in medical or dental school."

The Army will also follow a new policy of commissioning selected doctors and dentists in the Regular Army in grades as high as Full Colonel depending upon their age and professional qualifications. In the past, medical and dental officers entering the Regular Army have been initially commissioned only as First Lieutenants. Wartime officers have been integrated into the Regular Army in grades through that of Major. The measure authorizing appointment of Regular Army Medical and Dental Corps officers in advanced grade also provides for such officers to be credited, for purposes of promotion, with the minimum number of years of service "now or hereafter required for promotion of officers of the Medical and Dental Corps to the grade in which appointed."

The Surgeon General explained that these important changes in the Army's medical program have been made possible by legislation passed by Congress on July 26 and signed by President Truman on August 5. This measure is in the form of an amendment to the Pay Readjustment Act of 1942.

General Bliss said the $100 increase in compensation for Army medical and dental officers will benefit not only Regular Army but also Reserve, National Guard, and Army

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**Editor's Note.*—The "doctors and dentists" theme in the above release coming from the Surgeon General's office no doubt unwittingly reflects much in regard to the unhappy situation that has developed and that is being so vigorously discussed in regard to the complaints of the dental corps in the armed service.

No doubt a first step in clearing up this situation would be for the Surgeon General's office, in writing its releases, to throw out the reference to "doctors and dentists." "Physicians and dentists" would convey both a meaning and thinking much more appropriate.

of the United States officers. Former students of the Army Specialized Training Program who are required to serve on extended active duty are eligible for this increase in compensation when they apply for and are accepted into the Regular Army. Under study at present is the length of time which these officers trained under the Army Specialized Training Program must serve on active duty before becoming eligible to apply for the regular establishment. This policy will be announced when formulated.

The enabling legislation limits the duration of these benefits to thirty years of active service.

The extra $100 monthly compensation will be paid not only to officers who are on extended active duty as of September 1, the effective date of the legislation, but to all eligible Medical and Dental Corps officers who are commissioned in the Regular Army, or volunteer for extended active duty within the next five years.

The Surgeon General stated that the enactment of this and other legislation including the "Officer Personnel Act of 1947," which established an accelerated promotion schedule, will enable the Army Medical Department to offer much greater advantages than it has in the past to doctors and dentists seeking careers in the governmental service.

Medical Service Corps Created as Part of Regular Army

A far-reaching change in the permanent organization of the Medical Department of the Army went into effect August 5 following President Truman's approval of legislation creating a Medical Service Corps in the regular establishment.

This legislation makes it possible for the first time to give Regular Army commissions to specialists in the scores of fields now closely allied to medicine—to bacteriologists, entomologists, psychologists, sanitary engineers, pharmacists, chemists, electronics experts, and the like. These will be grouped together in a new corps under the Medical Department of the Army.

The need has been evident for a long time. Up to now the Medical Department has been made up of six corps—Medical, Dental, Veterinary, Pharmacy, Nurse, and Women's Medical Specialists. It has been possible to commission specialists in other fields only in the reserve from which they could be called to service in a national emergency.

Notes of Interest

Dr. W. B. Bunch announces the removal of his office to Masonic Building, Delray Beach, Florida.

Robert H. Crossley, D.D.S., announces the opening of his office at 1735 West Broadway (at Burrard), Vancouver, British Columbia, practice limited to orthodontics.

Dr. John J. Dann announces his return from the military service and the opening of his office at Suite 826 Beaumont Medical Building, 3720 Washington Boulevard, St. Louis 8, Missouri.

Rolenzo A. Hanes, D.D.S., announces the opening of an office at 3740 Central Avenue, Indianapolis, Indiana, for the practice of orthodontics.

Virgil Loeb, M.D., D.D.S., announces that Harold R. Schreiber, D.D.S., is now associated with him in practice, Suite 309 Beaumont Building, 3720 Washington Blvd., St. Louis, hours daily except Sunday by appointment, practice limited to periodontia and oral diagnosis.

Frederic T. Murlless, Jr., D.D.S., announces the association of Orville L. Hankins, D.M.D., in the practice of orthodontics, 43 Farmington Avenue, Hartford, Connecticut.

Dr. Olin W. Owen announces the association of Dr. Harold A. Eskew in the exclusive practice of orthodontics, 1001-4 Liberty Life Building, Charlotte, North Carolina.

Seymour A. Robins, D.D.S., M.S., announces the opening of his office at 54 Church Street, Hartford, Connecticut, practice limited to orthodontics.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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In the January issue each year, the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY will publish a list of all of the orthodontic societies in the world of which it has any record. In addition to this, it will publish the names and addresses of the officers of such societies.